

The SHORT WAVE Magazine

VOL. XXI

OCTOBER 1963

NUMBER 8

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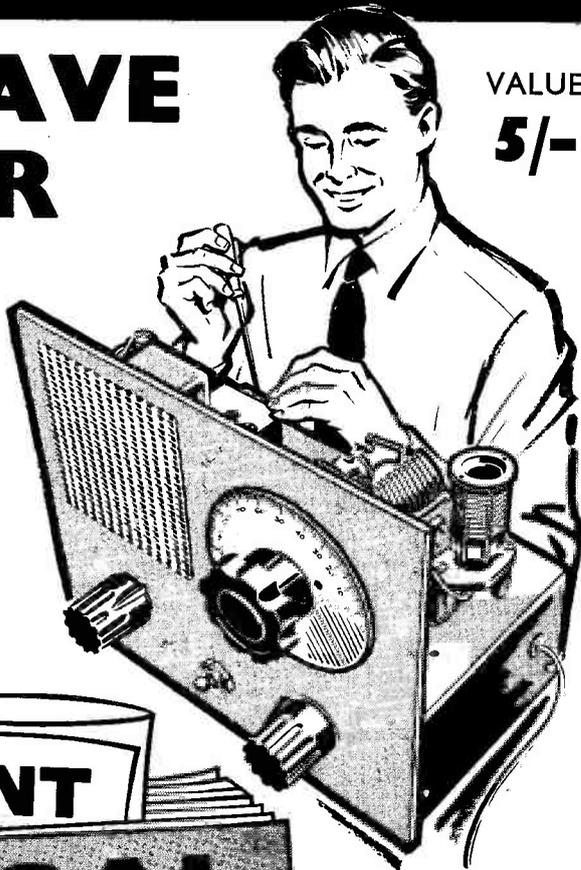
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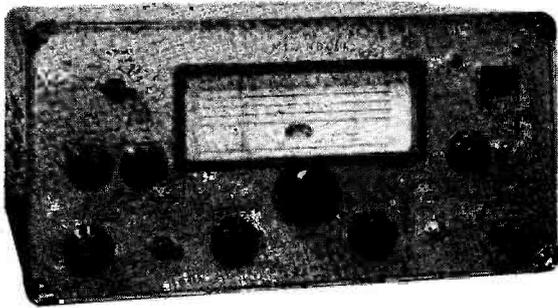
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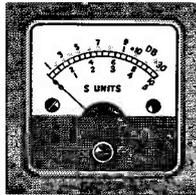
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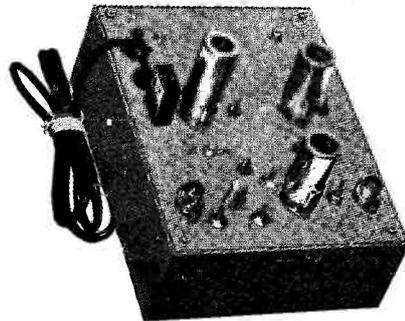
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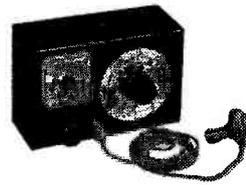
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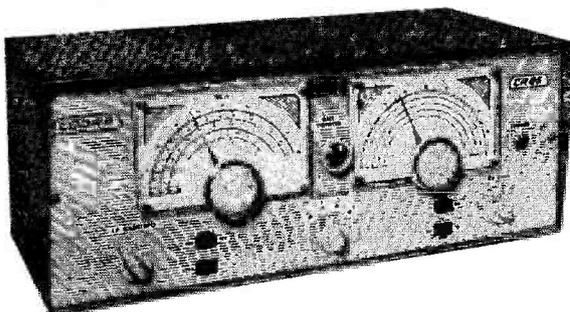
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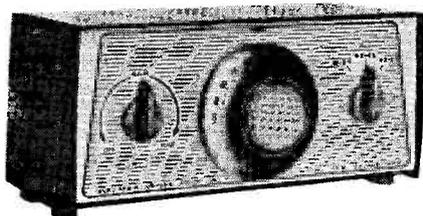
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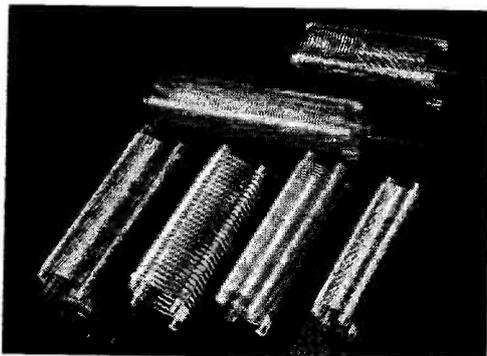
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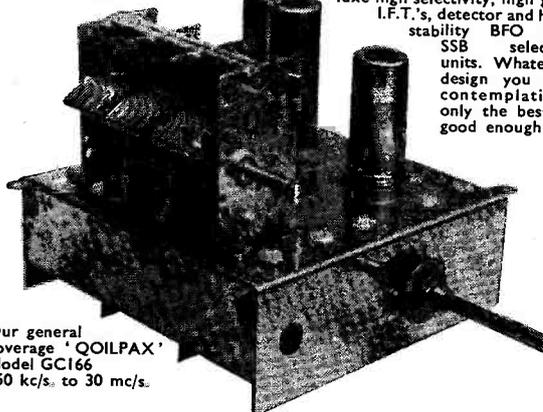
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SHORT WAVE MAGAZINE

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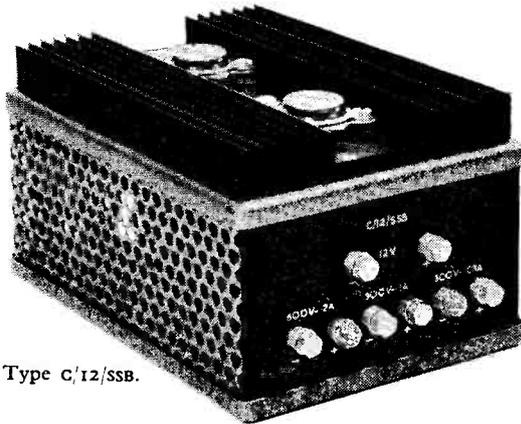
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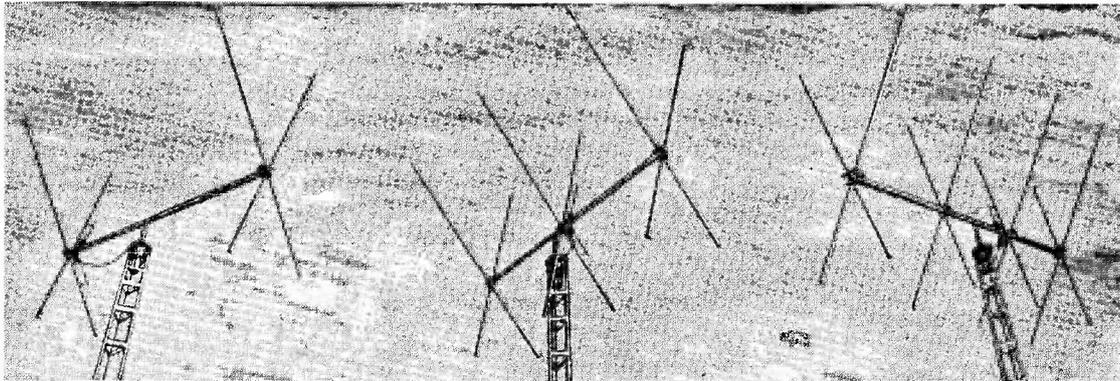
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The SHORT-WAVE Magazine

EDITORIAL

Foreseen On our last two appearances in this space — under the headings “Political” and “Consequences” — the situation in which Amateur Radio now finds itself vis-à-vis the rest of the world’s users of radio frequencies was discussed. We arrived at the point where (let’s imagine), somebody like the Budmarsh of Coochpawani, representing the Republic of Saudi-Banana, and the leader of the Afro-Asian lot at an I.T.U. conference, had demanded the sequestration of all amateur frequencies. Since, unfortunately for us all, the emergent nations have considerable voting power, it follows that a compromise has to be arrived at — and the only solution is more frequency-sharing.

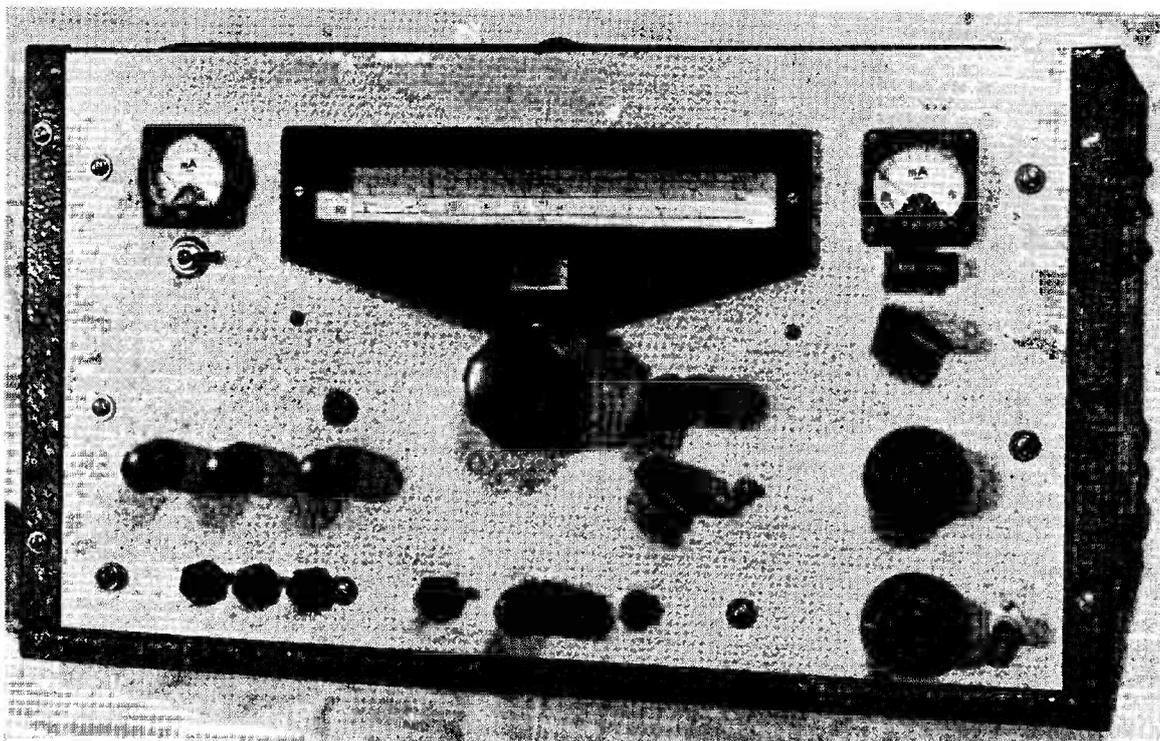
Since there is already a very high degree of sharing by the commercial and broadcast interests in the frequency areas allotted to them, the argument for exclusive amateur bands could be difficult to sustain, in spite of the considerable congestion of amateur stations on those bands.

But there are ameliorating circumstances in this context. One has been referred to here before — the time-space-location factor. In practice, this works for and against the commercials (depending on band used, time of day, and signal path) just as it does for us. It means that there are relatively interference-free periods on the HF bands (due to skip, the reduction in commercial working at week-ends, and similar factors) in other parts of the world as well as in the U.K. The 40-metre band in the early hours and 80m. at week-ends, when much of the non-amateur activity dies down, are good examples.

Since on most bands we have already had to become accustomed to working through, alongside or against commercial stations, it follows that for amateurs the solution to the problem of congestion can only be better equipment (more selective receivers, and beam aerials); the use of SSB and CW as the communication modes (the latter in particular); and transmitters of extreme frequency stability. Together with all this will have to go improved operating techniques, analogous to the ability of the competent CW operator to hold the signal he wants against several others on the same frequency. This, incidentally, points the value and importance of CW as the most effective mode for amateur communication.

The larger problems that would arise from further band-sharing with commercials are, at present, only difficulties foreseen — the situation has yet to develop to the extent and in the manner outlined here. What will eventually happen depends to a great extent on people like the aforementioned Budmarsh of Coochpawani. In the meantime, since amateur congestion within our at-present exclusive bands could itself be a serious deterrent to commercial intrusion, it is clear that the more amateurs there are — licensed and on the air and prepared to fight stations using our frequencies — the less the likelihood of our bands being intruded upon. Our very numbers can contribute to our self-preservation vis-à-vis the commercials. And as AT station distribution is world-wide, this may in the end be the best weapon we have.

Austin Fobyl
G6FO.



General appearance of the three-band SSB transmitter, as constructed by G3BDQ. The main tuner is an Eddystone type 898 dial assembly modified to accommodate just the three bands, as explained in the text. There are the minimum of controls, for the essence of the design is simplicity in tuning up and on-the-air operation. The left-hand panel meter reads PA grid current. An AR88-style cabinet houses the transmitter complete, including its silicon rectifier power supplies.

MODERN SSB TRANSMITTER FOR THREE BANDS

QRO DESIGN FOR SSB/CW
OPERATION—MODULAR
CONSTRUCTION—300 WATTS
P.E.P.—COMPLETELY
SELF-CONTAINED

PART I

J. D. HEYS (G3BDQ)

HAVING constructed several SSB transmitters, all of which embodied various units inter-connected but positioned in different parts of the operating position and work bench, the writer determined to design and build a completely self-contained "one box" assembly which would be the same size as an AR88 receiver and yet have a power capability exceeding that of the average commercially-built

transmitter or transceiver. In addition the design had to incorporate the latest techniques in sideband generation and equal or surpass off-the-counter transmitters with regard to carrier and sideband suppression, VFO stability, reliability and ease in tuning up. The task was obviously a difficult one and almost twelve months passed between the pipe-dream stage and the appearance of the completed hardware, now to be described.

Realising that perhaps others would like to construct a similar transmitter or just parts of the complete circuit it was decided that the project must be broken down into small units or modules, each capable of being built and tested independently. This technique is a favourite of the writer and it greatly simplifies construction, setting up and future servicing.

The transmitter operates on the 80m., 20m. and 15m. bands, which at present carry most of the SSB traffic; there is no reason why 40m. and/or 10m. should not also be incorporated by the competent home constructor. It is a question of having greater switching complexity and extra mixing crystals. (This point will be covered in more detail later in the article.) By using a forced air cooled 4X150A valve as a linear amplifier 300 watts p.e.p. on sideband is achieved, while on CW the amplifier must be operated well below its capabilities to satisfy

Our well-known contributor presents another practical design for the amateur constructor, based on the most modern techniques and using readily available parts throughout. This time it is an 80-20-15m. SSB/CW transmitter capable of 300 watts p.e.p., fully contained in an AR88-style cabinet, and incorporating the latest circuit ideas. It has taken the best part of 12 months to finalise the prototype and all who build this transmitter, or embody G3BDQ's circuitry in designs of their own, can be assured of an on-the-air performance comparable with any commercial

apparatus of similar rating. The constructional layout is such that the transmitter can be built in unit form, which simplifies the work considerably. And in case anyone should imagine that the prototype as described and illustrated here is a professional workshop job, let it be said, again, that the author has no more than the average amateur's time, facilities and bench equipment for constructional work. Because of the detailed description and illustration involved, the article will appear in three parts.

—Editor.

the 150 watt DC input licence conditions in this country.

General Circuit Description

Reference to the block diagram (Fig. 1) will clarify the description of the circuit. The basic 9 mc SSB generator is built around one of the excellent 9 mc McCoy crystal filter units now obtainable in this country (from K.W. Electronics) and the use of this relatively high frequency goes far towards the simplification of the later stages in the transmitter—for by having a VFO tuning between 5 mc and 5.5 mc, output on 80m. and 20m. can be achieved by single-frequency conversion. Double conversion is only necessary for 15m. operation. Two carrier crystals are supplied with each McCoy filter enabling either upper or lower sideband to be selected. The use of an RCA 7360 beam deflection valve (V1) as a combined carrier/oscillator and balanced modulator ensures good carrier suppression; this is in the order of 50 dB or better. A cathode-follower carrier insertion valve

(V3) allows for a wide control of drive when using CW. The EF183 Class-A amplifier (V4) has negative feedback applied to it from the driver stage (V9) later in the transmitter, and this feedback, or ALC, may be set to the desired level and so prevent PA overdrive or "flat-topping" on voice peaks.

A second 7360 valve (V6) is employed in the frequency converter and driver unit, this time as a balanced mixer. Output from the VFO (another sub-unit) is amplified in V7A and when mixed with the 9 mc SSB signal, or carrier, produces 80m. or 20m. output at the anode of the 7360. Wide-band couplers for these two ranges can be switched into circuit and they couple directly to the control grid of the 6CL6 driver valve (V9). The use of wide-band couplers reduces the number of controls and simplifies the tuning up procedure. For 15m. output a second mixer (V8) comes into operation and combines the 80m. signal with the 17.5 mc available from a crystal oscillator V7B. At the anode of this second mixer another wide-band coupler is used.

[over

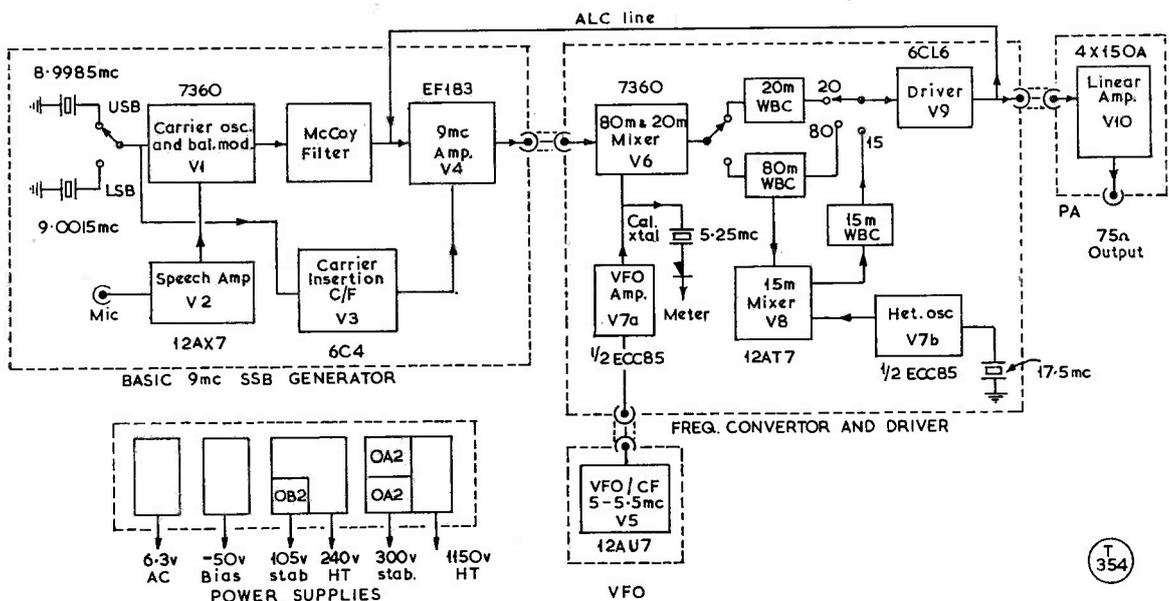


Fig. 1. Block diagram of the G3BDQ 80-20-15m. Sideband transmitter, which is constructed in five separate units, or modules. Any or each of them may be built separately and incorporated into other apparatus if it is not desired to follow the transmitter design exactly as described here.

Despite the comparatively high power of the final amplifier a 6CL6 driver suffices. It may come as a surprise to many that the 4X150A when operated in Class-AB1 has exactly the same drive requirements as a single 6146 valve! (50 volts peak.) Should the constructor wish to produce a transmitter with a smaller power capability, the 4X150A amplifier can be replaced by one or a pair of 6146 valves, in which case a 700-volt HT line would suffice.

The power supplies are built into the transmitter and the extensive use of silicon power diodes helps to make this possible. Stabilised HT voltages are provided for the VFO and the 4X150A screen grid, and the bias supply is used for grid-block keying of the first mixer, V6, and also for muting during receiving periods, in addition to its normal function. The writer is not fond of the VOX mode of operation and the send/receive changes are effected by a desk mounted micro-switch connected to relays outside the transmitter. Should VOX be considered necessary any of the standard circuits could be adopted and incorporated in the design.

The use of miniature multi-pin plugs and sockets to carry power leads and such between units makes the removal of any module for testing or servicing an easy matter. Coax with Belling plugs and sockets is used for all RF connections between the units.

SSB Generator Details (Fig. 2 opposite)

This unit is built upon a small aluminium chassis measuring 6 ins. x 5 ins. x 2½ ins. and the disposition of the main components can be seen from the under-chassis photograph. SW1 is a rotary low-capacity single-pole two-way switch used to select either of the two carrier crystals (X1 and X2). CX1 and CX2 are small 3/10 μF trimmers which may be needed to pull the crystal frequencies to the correct position on the filter response slope. These may not actually be required and in the writer's case only one crystal wanted a little extra capacity across it, the trimmer being set to its minimum. (It is suggested that the crystals should be tried in the first place without these additional parallel capacities.) The diode D1 is always needed when using the 7360 valve to prevent its control grid from being driven positive and so running into non-linearity.

Two types of McCoy filters are available, the "Golden Guardian" and the less expensive "Silver Sentinel." Whichever one is used it must be remembered that the purchasers of the alternative mechanical filters still have to provide their own (quite expensive) carrier crystals—yet with both McCoy units matched carrier crystals are included. The transmitter described here uses the "Golden Guardian" filter which has quite an impressive performance. The unwanted sideband rejection is given as greater than 55 dB. On-the-air reports indicate that this figure is correct. The filter shape-factor from 6 to 20 dB is 1.15 to 1 and this results in a clean sharp signal. The cheaper "Silver Sentinel" filter is quoted as having an unwanted sideband rejection figure of 40 dB or greater, and its shape factor is 1.21 to 1, which is more than adequate for

Table of Values

Fig. 2. Circuit of SSB Generator and VFO

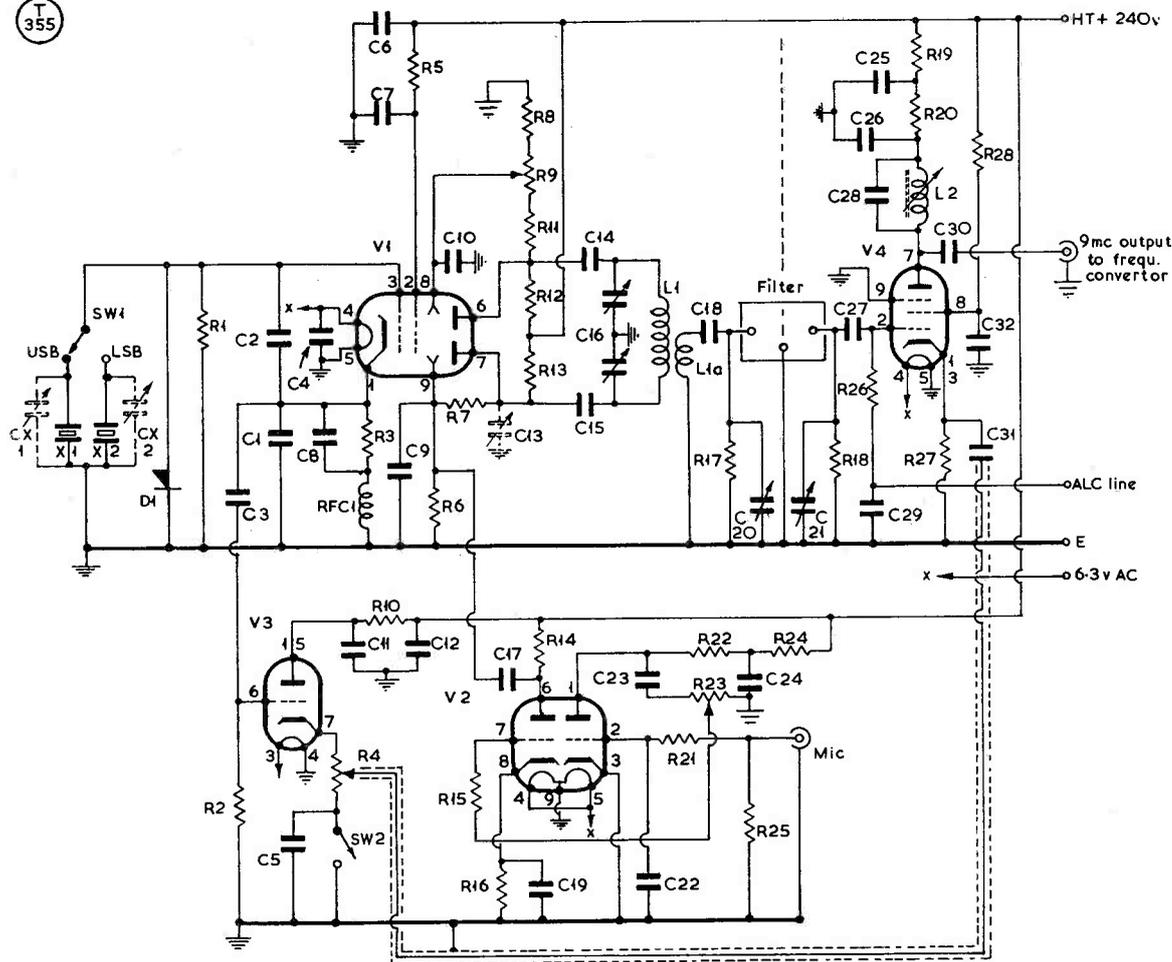
C1 = 75 μF silver mica	C39, C40 = 680 μF fired silvered mica type C22E, 350v. (J, M & C.)
C2 = 30 μF silver mica	C43, C44 = .001 μF ceramic feed-through (Erie)
C3 = 10 μF tubular ceramic	CX1, CX2 = see text
C4, C10, C41, C42 = .01 μF disc ceramic	R1, R2, R11, R22, R26 = 100,000 ohms
C5, C6, C9, C11, C29 = .001 μF disc ceramic	R3 = 300 ohms
C7, C8, C12, C25, C32 = .005 μF disc ceramic	R4 = 2,000 ohms pot. with switch (SW2)
C13 = 2/7 μF trimmer (see text)	R5 = 33,000 ohms
C14, C15, C23, C26, C27, C30, C31 = .0015 μF tubular ceramic	R6 = 56,000 ohms
C16 = 25 μF + 25 μF variable air	R7 = 120,000 ohms
C17 = 0.1 μF paper	R8, R14 = 47,000 ohms
C18 = 100 μF silver mica	R9 = 25,000 ohms pot.
C19 = 10 μF elect. 15v. wkng.	R10 = 12,000 ohms 1 watt
C20, C21 = 50 μF variable air trimmer	R12, R13, R24, R28 = 68,000 ohms
C22 = 470 μF tubular ceramic	R15, R21 = 4,700 ohms
C24 = 20 μF elect. 350v. wkng.	R16, R19, R27 = 1,000 ohms
C28 = 20 μF tubular ceramic	R17, R18 = 640 ohms or 560 ohms (see text)
C33 = 10/40 μF ceramic neg. temp. coeff. 750ppm. (Electronics)	R20 = 8,200 ohms 1 watt
C34 = 70 μF (35 + 35) type U.101.S/S (Jackson Bros.)	R23 = 3 megohm pot.
C35 = 10 μF variable air wide spaced	R25 = 2 megohms
C36 = 4/20 μF ceramic neg. temp. coeff. 470ppm. (Electronics)	R29 = 10,000 ohms
C37 = 30 μF fired silvered mica type C22E, 350v. (Johnson, Matthey & Co.)	R30 = 750 ohms
C38 = 300 μF fired silvered mica type C22E, 350v. (J, M & C.)	RFC1, RFC2 = 2.5 mH type "RFC1" (Electronics)
	X1, X2 = Carrier crystals supplied with McCoy Filter
	SW1 = SP two way wafer switch
	L1 = 43 turns 26 g. enam. close wound on 0.4-in. diam.
	L1a = 5 turns p.v.c. insulated wire mid-way along L1
	L2 = 12 μH "Quilmax" (Electronics)
	L3 = 3.3 μH "Stabcoil" with iron-dust core (Electronics)
	D1 = OA79 Mullard
	V1 = 7360 RCA
	V2 = 12AX7 Brimar
	V3 = 6C4 Brimar
	V4 = EF183 Mullard
	V5 = 12AU7 Brimar

amateur work. Both the filters have a bandwidth of 2.8 kc at the 6 dB point.

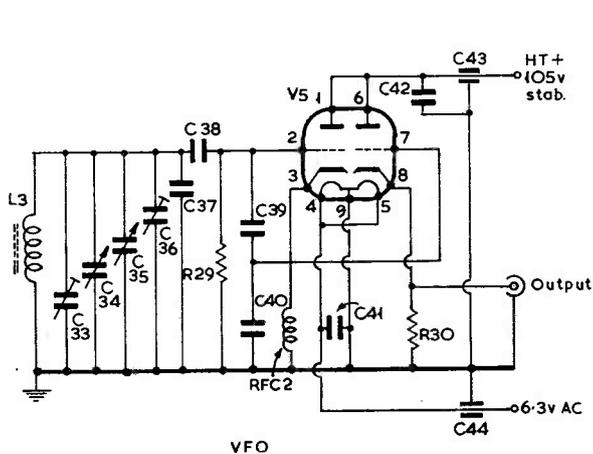
Adequate AF gain is provided by a two-stage RC coupled amplifier V2, which is the ubiquitous 12AX7 valve. No iron-cored components are needed to match its high impedance AF output to one deflection plate of the 7360 valve. The tuned circuit comprising L1 and C16 must be balanced to earth if the greatest degree of carrier suppression is to be achieved. It

Fig. 2. Circuit diagram (at right) of two essential units in the C3BDQ SSB transmitter — the basic 9 mc Sideband generator, and the VFO. The use of a McCoy crystal filter (see text) and McCoy carrier crystals make the construction and alignment of the SSB generator quite an easy matter. A commercially-made (Electronics) coil is available for the VFO, which not only simplifies setting up but also contributes much to its stability.

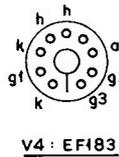
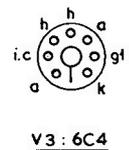
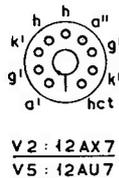
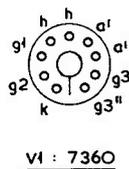
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SIDE BAND GENERATOR



VFO



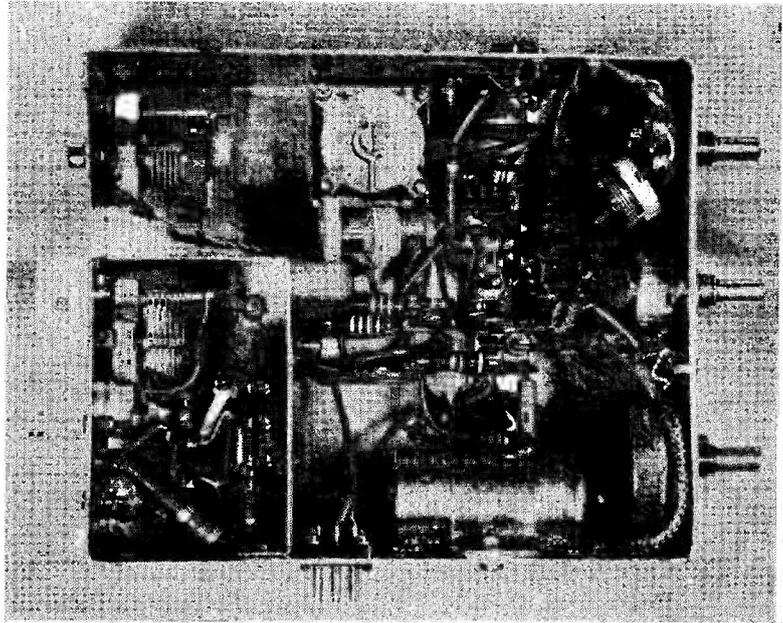
may be necessary to add a little extra balancing capacitance to one of the anodes of the 7360. This is shown in the circuit (Fig. 2) as C13, but was not needed in the prototype transmitter. To obtain the manufacturer's performance figures the input and output loads must be correctly matched to the impedance of the filter. In the case of the "Golden Guardian" filter this means an input and output resistance of 640 ohms being used. (It is 560 ohms in the case of the "Silver Sentinel" filter.) Owing to the difficulty of making the coupling link L1a match exactly to either of these impedances, C18 and R17 are used in conjunction with this winding. Both the input and output connections to the filter are shunted to earth with 50 μ F variable capacitors C20, C21, as recommended by the manufacturer.

It is important to put effective screening between the input and output circuits of the filter. An aluminium screen the same depth as the chassis completely encloses the EF183 amplifier wiring and filter output components. This amplifier V4 is inherently stable owing to the low-impedance input circuitry, and the tuned circuit comprising L2 and C28 together with the capacitance of the coax connecting the SSB generator to the following unit resonates at 9 mc. A negative ALC voltage derived from the driver stage of the transmitter is applied to the control grid of V4, and its cathode is connected *via* C31 and a screened and earthed lead to the slider of R4, the carrier insertion control on V3. When SW2 is closed the cathode follower V3 operates and a variable amount of carrier insertion may be obtained. With SW2 open no carrier voltage can bypass the filter.

Testing the SSB Generator

The satisfactory setting up of this unit determines the ultimate quality of the whole transmitter so every care should be taken to ensure that it is working properly before proceeding to the rest of the transmitter construction.

With a suitable power supply connected (200/250 volts HT) and only V2 inserted it is an easy matter to connect a crystal microphone to its input socket and, by using a pair of 'phones with a condenser in one lead, test the AF amplifier for speech quality and hum. Any hum present must of course be cleaned right out for it can produce a pilot carrier in an SSB transmitter! With V1 in its socket a general-coverage receiver with an S-meter may then be used to check that both the carrier crystals oscillate satisfactorily. Balancing out the carrier can be done with the receiver loosely coupled to the filter side of C18—or



View underside of the 9 mc SSB generator. The EF183 amplifier (V4) and its associated components are within the screened compartment. Near the large electrolytic condenser can be seen the valve base for V2. The crystal holders and an air-trimmer Cx (see text) are at upper right, and the three panel controls from bottom up are: Audio gain (R23 in Fig. 2); Carrier insertion (R4 and SW2); and Sideband selector (SW1). The pre-set balance control R9 is at upper right.

instead with a sensitive RF sniffer comprising a 9 mc tuned circuit, crystal diode and a 50 μ A meter. R9 is adjusted for minimum indicated carrier, and then by trying C13 connected to each anode of the 7360 valve in turn see if additional suppression can be obtained. C16 is adjusted to resonate L1 at 9 mc, and is most easily done before the carrier suppression is completed. The general-coverage Rx may now be used to listen to the suppressed-carrier double-sideband signal present at the input terminal of the filter (at the junction of C18 and R17). The carrier suppression may not sound too good at this stage but do not worry for it is caused by stray radiation from the carrier oscillator getting direct into the receiver and is not a fault in the unit.

Insert V3 and V4 and temporarily earth the ALC line to ensure a grid return for V4. With SW2 closed and R4 turned to maximum carrier insertion couple the sniffer or receiver to the 9 mc output socket *via* a length of coax similar in length to that needed for final inter-unit connections and adjust the core of L2 for maximum output. Switch off SW2, and with the 9-0015 mc carrier crystal in operation and V1 temporarily unbalanced (by moving the slider of R9 to one end of the track) adjust C20 and C21 for the maximum output. These controls are very flat and not at all critical in setting. R9 may now again be set for minimum carrier level and a single sideband signal (lower sideband) can be monitored on the receiver. The upper sideband should next be checked with the 8-9985 mc carrier crystal in operation. If the audio response seems restricted in frequency,

CX1 or CX2 may be wired in and adjusted for good speech quality. In most cases, providing the lead lengths to the crystals and switch are short, CX1 and CX2 will not be needed. The correct positioning of the carrier frequencies is 10 dB down the filter response slope, and not 20 dB as is more usual, owing to the exceptionally steep sides of the McCoy filter response curve.

The SSB generator when tested and set up as explained may now be put on one side and further constructional work commenced.

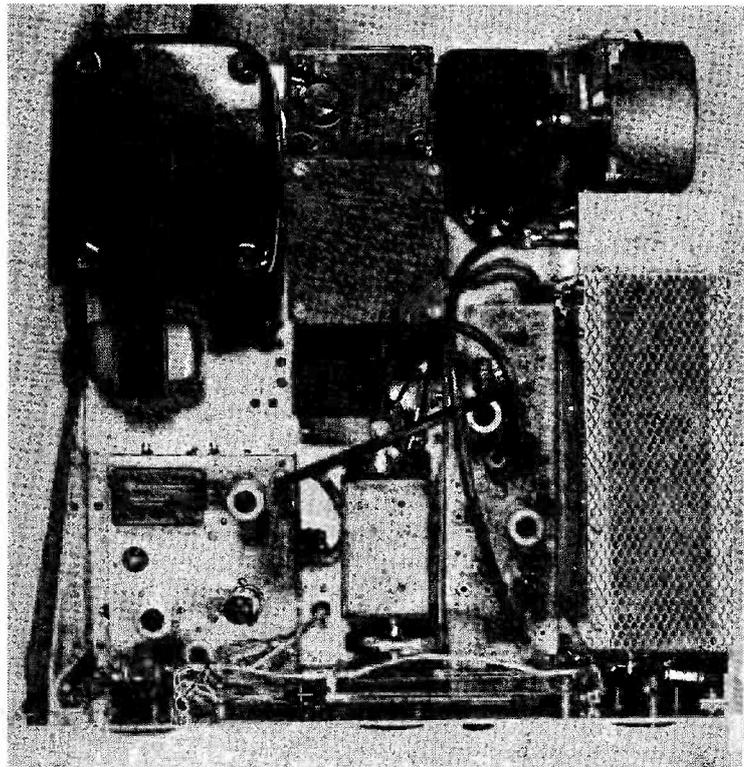
The VFO

Many otherwise good SSB signals are spoiled by drift, and this applies to all types of transmitter, whether commercial or amateur built. All VFO's drift, but it is possible to reduce the amount to negligible proportions by careful design and construction techniques. Few amateurs build mechanically unstable VFO's these days, but a great number fail to overcome the *thermal drift* problem and are often compelled to place the VFO unit away from the rest of their equipment. To include the VFO unit in the one-box concept of this transmitter and yet retain excellent frequency stability over long periods might appear to be too difficult for the average home constructor. But by using high-grade components, a heat baffle and a little patience the task can be accomplished. The VFO described has an initial drift of 300 c/s during the first fifteen minute warm-up period, and thereafter its stability is better than 30 c/s during any half-hour period.

The VFO circuit (p.407) uses a 12AU7 valve, one triode section operating as a hot cathode Colpitts oscillator and the other as a cathode follower. This type of oscillator was chosen in preference to the series-tuned or Clapp version, for the latter with its larger coil suffers from high coil currents with consequent coil heating, and output also varies considerably over its tuning range. It is easier to compensate for external temperature variations acting upon capacitors than it is upon inductors. Using the component values listed the VFO tunes from 4.990 mc to 5.510 mc and the tuning scale is reasonably linear with no cramping at one end, a serious fault with many VFO designs.

When home-made coils are specified it is almost impossible for the reader to reproduce them

exactly and the slightest deviation in wire gauge, winding length, former dielectric or core material can produce an inductor far different from the original. For this reason a standard Electroniques "Stabcoil" was used for L3. The main tuning capacity C34 is a well-made double-bearing component, and the air trimmer for calibration setting is one of the double-spaced types with a ¼-in. spindle. Standard silvered mica condensers often suffer from "capacity jitter" or scintillation, which is produced when the thin mica plates move slightly with temperature variations—so special high quality (and rather expensive) fired and encapsulated silvered mica capacitors are specified for C37, C38, C39 and C40. These capacitors are in the "Silver Star" range produced by Johnson, Matthey and Co., the scientific instrument manufacturers, of Hatton Garden, and exhibit outstanding stability with an excellent temperature coefficient. To compensate for the drift down in frequency caused by the temperature rise within the transmitter cabinet, considerable experiment with ceramic capacitors having a negative temperature coefficient was needed. Bench tests are of little value in this instance and final adjustments to C33 and C36 must be made with the VFO unit working in the completed transmitter. Two



Top interior view of the G3BDQ Sideband Tx. The iron-cored power supply components are along the rear of the main chassis, together with the blower unit for the 4X150A linear PA, which is in the mesh-covered compartment. The VFO unit is front centre and to the left is the SSB generator unit. Between the VFO and PA compartments is the housing for the frequency converter, with its wide-band couplers and the 6CL6 driver stage. RF inter-connections are made with coax, and miniature plugs and sockets are used for power supply and other leads.

ceramic NTC condensers are used, one (C33) being positioned close to L3 and the other (C36) in proximity to C34, for the coil and main tuning condenser have different positive temperature coefficients and different warming-up times.

VFO Construction

The VFO is built in one of the Eddystone diecast boxes (Cat. No. 650) turned on its side, and the valve V5 projects at the rear where the two power supply feed-through capacitors C43 and C44 and the coax output socket are also located. The unit is mounted 1½-in. above the main transmitter chassis on sturdy aluminium brackets, and the four securing screws for the lid are accessible so that adjustments may be made when the transmitter is completely assembled and in its case.

The layout of the components within the box is not critical so long as everything is bolted or glued down securely and there are no long floppy leads. Items making up the tuned circuit are placed as far as possible from the valve base from which comes considerable heat. The base of the diecast box (actually positioned to one side) faces the 6CL6 driver valve which radiates a great deal of heat and is only about 2¼-in. away from it. A polished aluminium plate is glued with impact adhesive to four plastic sponge squares which are in turn glued to the base of the VFO box, and this makes an effective heat reflector. The spindle of the main tuning condenser is connected to the Eddystone type 898 slow-motion drive with a flexible coupler, and the spindle of the calibration pre-set capacitor C35 protrudes below the unit. This spindle and a small knob on the front panel of the transmitter below the main tuning knob are joined by a flexible coupling cable which drops through a hole in the main chassis and then bends forwards towards the panel.

As three bands are covered by the transmitter only three of the six available scales on the Eddystone 898 dial are required. The rectangular metal escutcheon and plastic window of the original have been discarded and a new dial front is fashioned from opaque black perspex with a 1-in. wide viewing slot. A suitably sized rectangular hole has also been cut to allow the circular logging scale to be seen. In the writer's humble opinion the dial modifications enhance the appearance of the transmitter front panel. Two miniature 6-volt bulbs provide adequate illumination of the dial face.

Testing the VFO

The frequency of the VFO is affected only slightly by changes in HT voltage but a 105-volt stabilised power supply is used. For initial bench testing any reasonably stable HT source between 90 and 150 volts may be applied. A general-coverage receiver again is most useful as a test instrument as it can check the frequency coverage of the VFO. Should the tuning range be too large or too small this can be

brought on by a slight adjustment of the iron-dust core in L3. If carefully built the VFO should not be sensitive to mechanical shock or vibration. It must be remembered that the transmitter contains a blower for cooling the PA, and an ill-constructed VFO could produce objectionable frequency modulation. It is a good idea to give the unit a long soak run to age the 12AU7. A new valve often has variable emission characteristics.

When the transmitter is completed the VFO can be finally checked and adjusted for stability under ambient thermal conditions. A crystal oscillator and receiver should be used and the amount of drift noted for different warm-up times. Adjustments to C33 and C36 should be made, remembering that over-compensation or too much capacity in these positions can produce a drift in the high frequency direction. When satisfied that maximum stability has been obtained the calibration of the dial scales can be carried out. This may be done with a frequency meter such as the BC-221 or with a stable receiver having a 100 kc crystal and 10 kc dial divisions—such as the Drake 2B, the K.W.77 or the Eddystone 888A. The use of the internal transmitter calibration circuit will be discussed in a further part of the article.

(To be continued)



"What! 599 on phone!" print G3MQT

For The Beginner

PLANNING A STATION

Whether you propose using commercial amateur-band equipment, or are starting with some gear you have built yourself—and this, incidentally, is by far the better way for any beginner in Amateur Radio—the station layout and control system will need a certain amount of planning. Elaboration is not an end in itself, though it may come with time and experience. This article discusses the essentials of station planning, so that the newly-licensed operator is assured of at least starting on the right foot

READERS of the previous articles in this series, and also of the earlier articles on simple receivers and transmitters in the "SWL" feature, occasionally write to us in these terms: "I now have a small transmitter, an old war-surplus receiver and one of your nuvistor front-ends. I have passed the R.A.E. and take the Morse Test next month. But I still don't know exactly what more I shall need before going on the air and being able to call this collection of gear a 'station.' When are you going to enlighten us?"

Well, the answer is "Here and now." And this will be only the first instalment dealing with the layout of a station, since you can go on the air with only a few hours' preparation, but you can also go on improving your station for years. The main thing, for most novices, is to get going—and quickly.

The Essentials

All you need, as far as the bare bones are concerned, is a receiver, a transmitter, an aerial and the means of changing over rapidly from "transmit" to "receive." In the old days, when things were more leisurely, one could switch off the receiver, switch on the transmitter and change over the aerial by means of a single-pole double-throw knife switch—and there are some people who still do it that way! But nowadays this arrangement would only satisfy the newcomer for his first few days on the air; he would find everyone else making an almost instantaneous change-over, and he would realise the desirability of continuous monitoring by using the receiver. Both of these aims can be realised very easily by means of relays.

The simplest worthwhile arrangement is shown in Fig 1. The "station switch" is just an on-off toggle, conveniently mounted, which energises a small number of relays, probably from a 6-volt or 12-volt supply. One relay switches on the transmitter; one "disables" or mutes the receiver; and the third changes over the aerial, preferably in the coax lead to the ATU, which is therefore left in circuit for both receiving and transmitting.

Use the Same Aerial

Some old customs die hard, and it is amazing to find how many transmitting amateurs use a well-designed aerial for transmission, but cling to an ancient belief that any old piece of wire will do for

the receiver. Keen SWL's who have graduated to transmitting will not make this mistake; they know the value of a properly designed receiving aerial. They also find out, very early on, that if you have more than one aerial around the place, the one that gives best results for transmitting on a particular band and for a particular purpose is also the best for receiving.

So the ideal arrangement is to switch the same aerial over. If it is a dipole, a simple coax relay does it. If it is a doublet or one of the many end-fed types, a coax relay after the ATU does the same thing. And if you haven't a coax relay to start with, two simple relays or one double-pole relay of almost any type will do. Eventually it will be worth while to invest in a good-quality coax type, just for the aerial change-over.

Receiver Muting

In case a novice here and there doesn't know what receiver muting is all about, a word on that subject. If all you have in your newly-assembled shack is a simple aerial change-over from Rx to Tx, you will soon find that you need two pairs of hands. You arrive at "ar . . . k" on CW, or "G3 --- standing by" on phone; you change the aerial over, probably switching the transmitter off in the same

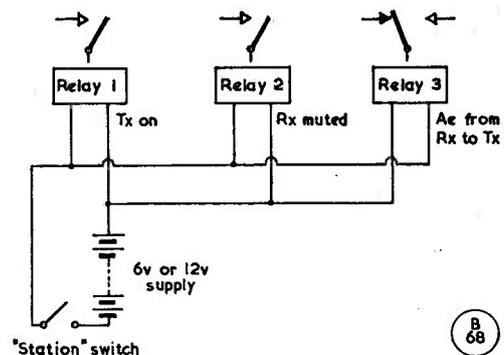


Fig. 1. Single-switch station control in its very simplest form. The relays operate as follows: "Transmitter On" is at make when energised. With several pairs of contacts it can be arranged to switch several circuits. "Receiver muted" may be either at make or break when energised, according to the kind of muting used. "Aerial from Tx to Rx" is a change-over type, preferably of the coax variety. The relay power supply can be a trickle charger.

operation ; and then, unless you want to be deafened by squeaks and squalls, you hurriedly turn the receiver gain right down to zero. You then find, if you want to monitor your own transmission on the next over, that you have to turn it up again ; and even then the front end of your receiver will probably be drastically overloaded by the RF picked up from the transmitter.

Muting, then, is best achieved by two simple operations. One is to short out (and that word "short" must be taken literally) the receiver input circuit, and the other is to modify the RF gain control or the AVC circuitry so that the early stages have their gain very much reduced when the transmitter is on.

Fig. 2 shows the shorting of the front end, with a single-pole relay (a), and with the rather more desirable double-pole arrangement (b). The latter scheme disconnects *both* sides of your input coax from the receiver and also shorts the two receiver terminals together. If the relay is mounted right up against the back of the receiver so as to make the path between the aerial and earth terminals *really* short (an inch or so) you may even find that further electronic muting is not necessary, provided you are not operating with your RF gain control wide open.

Regarding the disabling of the gain control or AVC : Of course, no two makes of receiver are identical in circuitry, and it is impossible to generalise. However, with many well-known types the desired result can be achieved by inserting a high resistance between the bottom end of the RF gain control and its connection to chassis. This extra resistance is in circuit when you transmit, and shorted out when you

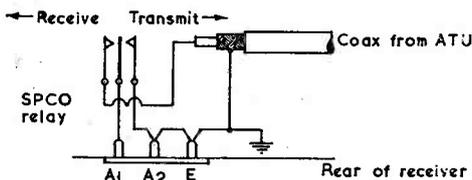


Fig. 2 (a)

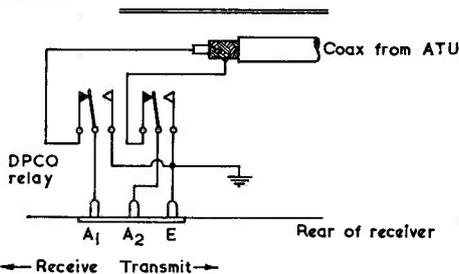


Fig. 2 (b)

B
69

Fig. 2. In the simple arrangement shown at (a), the single-pole relay changes one aerial terminal over from one line (inner of coax) to earth, the other terminal being earthed all the time. At (b) a double-pole relay (or two single-pole types) changes over both aerial terminals from the coax to earth, giving more complete isolation of the receiver input circuit when the transmitter is on.

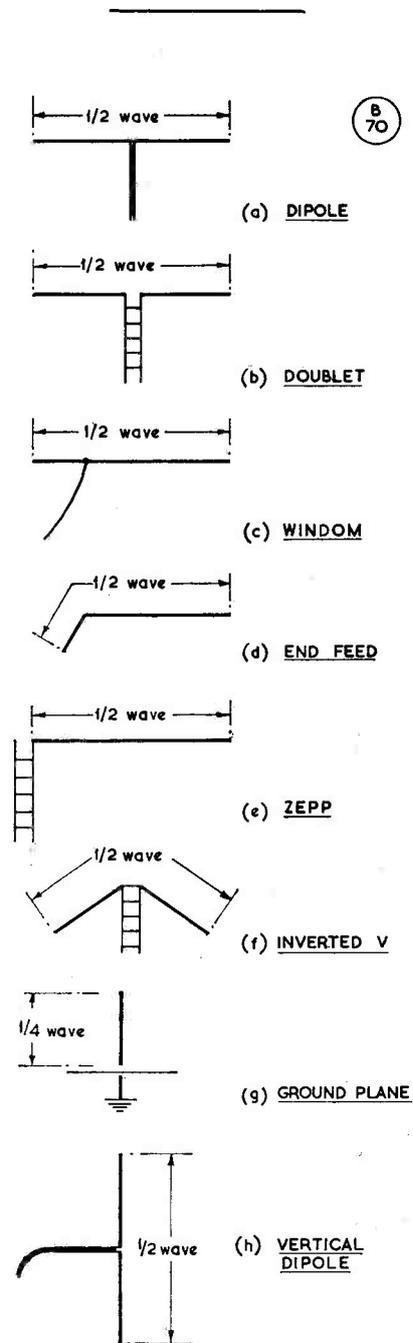


Fig. 3. A symposium of simple types of aerial. Ideally, all of them (except the ground-plane) should be cut to an electrical length of one half-wave. However, types 'b,' 'c,' 'd' and 'e' can all be cut for a half-wave at the lowest frequency used, and will then operate on the higher bands within harmonic relationship. For instance, types 'b' and 'e,' if 67 feet long (for 7 mc) will also operate well on 14, 21 and 28 mc. Types 'a,' 'g' and 'h' are strictly single-band systems.

receive. In other words, the relay must be arranged to break on "transmit" and make on "receive."

We have not mentioned the technique of carrying out the change-over from the receiver. Most modern communication receivers have a switch with a "transmit" position, which closes two terminals somewhere at the rear of the set; these can be used to operate the aerial change-over relay and the switching on of the transmitter. But almost invariably this "send-receive" switch is arranged to disable the receiver completely (by cutting the HT or the screen voltage to the early stages, for instance) and so your monitoring facility is gone. Not recommended, on the whole.

If you have connected your three or four relays to give a satisfactory change-over, you can refine the system still further by using a micro-switch, in parallel with an ordinary toggle switch, for energising the relays. The toggle switch will give the normal type of "over-to-you" operation; the micro-switch will give "push-to-talk" with finger pressure. It may be mounted in any convenient position on the bench, or taped to the microphone handle, or even re-arranged on the floor as a foot switch. (More than one amateur has a car-type headlamp dipper fitted on a sloping floor-board under the bench!)

ATU's and Aerials

The probability is that you already have an aerial and an ATU of some kind; but you find that what has been good enough for a receiver is not satisfactory for a transmitter. The ATU tuning condensers may not have sufficient spacing between plates, for example. The coils need not be heavy and clumsy, but should be wound with wire no thinner than 16 gauge or thereabouts. A versatile ATU was discussed in the January, 1963, issue of *SHORT WAVE MAGAZINE*, where Fig. 4 on p.605 shows the type that is best suited to coping with all kinds of aerials.

In case you should think "I only have *one* kind of aerial, and shan't need an 'ATU'"—think again! For one type of aerial, on one band, may become another type on other bands. One that is fed at low impedance on *Forty* may have to be fed at high impedance on *Twenty*. So, unless you are starting up as a one-band man, you will certainly need some



Typical medium-power amateur station using commercial equipment—a K.W. Vanguard transmitter; Eddystone 888A receiver, on tilt blocks; and an Acos microphone. At right is an absorption wavemeter, and behind the globe a monitor unit. On the wall is our DX Zone Map, and beside the Webb's log-book is a copy of the latest (when this photograph was taken) issue of "Short Wave Magazine." By the way, whose station is it—we haven't a clue!

flexible type of ATU.

Some of the simple types of aerial to choose from are illustrated in Fig. 4, and you will find most of them described in more detail in the articles entitled "Aerial Hints, Tips and Ideas" which appeared in the *Magazine* for December, 1961, February, April and June, 1962.

As many beginners start up (very wisely) on Top Band, they will certainly be interested in getting a "big" aerial into a small space, and they are recommended to study the June, 1962, issue (Fig. 1 on p.185) to this end.

The Extras

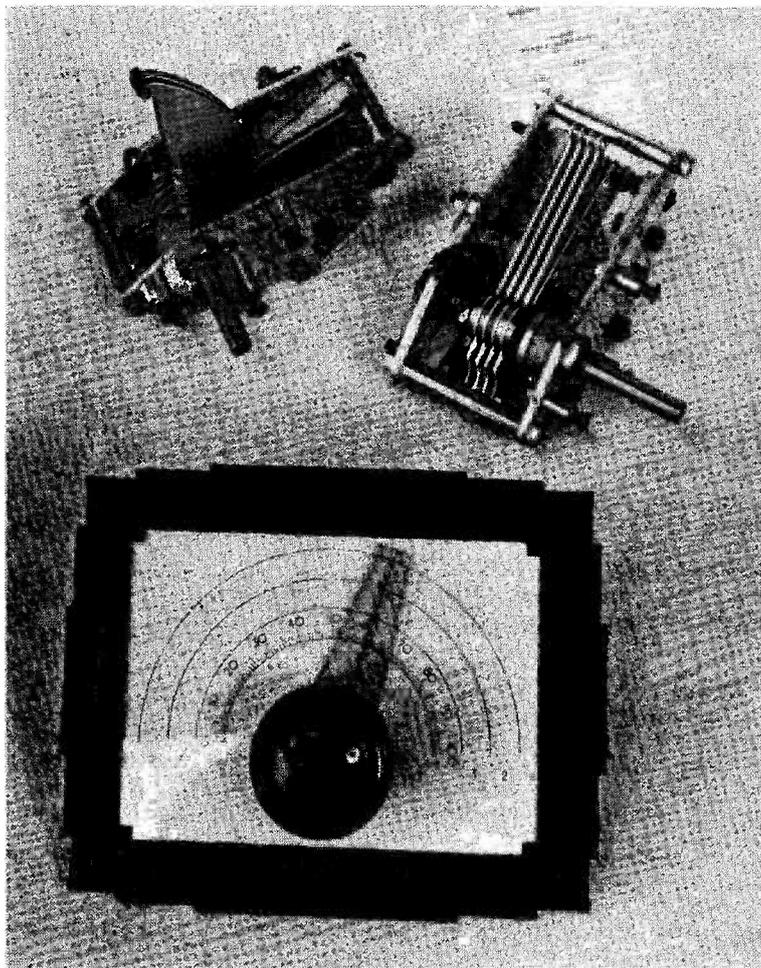
Keen SWL's will already have a selection of test equipment and ancillary apparatus at their disposal; this will stand them in good stead when they plan "the station." The absolute essentials are few—probably one could settle for a test meter of some kind and a frequency meter. But eventually other things become desirable, such as some kind of field strength meter inside the shack; perhaps a GDO and, later, a valve voltmeter. Certainly a reflected power meter (also known as a standing-wave ratio meter) is of great help in tuning up.

One of the pleasant things about ancillary equipment is that one can go on for ever! A receiver and a transmitter can eventually be finished off to one's own satisfaction, but there is no end to the gadgetry that can be built and (more important) used; and it is in the selection, construction and probably modification of all this that a real "station" takes shape.

SLF CONDENSERS — AND A NEW DIAL

Illustrated alongside are two condensers having a rather unusual plate shape, designed to give a virtually straight-line relationship between frequency reading and dial setting from near maximum to nearly minimum of the condenser capacity. Hence, it is of particular value for the calibrated tuned circuit in heterodyne frequency meters, VFO's and similar apparatus where a straight-line frequency curve is desirable. We were very pleased to find that these variable condensers are still available under the *Cyldon* trade mark. Very solidly constructed, with pig-tailed end-plate bearing, tip spacers to keep the rotor plates in alignment, and ceramic insulation on a heavy frame, the CA.1490/B.100 (top left) of 100 $\mu\mu\text{F}$ maximum, costs 39s., and the CA.1491/B.150 (150 $\mu\mu\text{F}$ max. capacity) is 40s. 9d. They are obtainable through Webbs Radio, of 14 Soho Street, Oxford Street, London, W.1.

Also shown here (below) is the new *Jackson Bros.* slow-motion drive and dial, Cat. No. 4103, which is one of the best of the new products we have seen. It has a strong and positive action, with two ratios — 6:1 fast, and 36:1 slow over 5° at any part of 0-100° scale. Dimensions overall are 5½ ins. wide by 4½ ins. depth, with 4-hole panel fixing, taking a 1½-in. dia. hole for the drive unit.



AMATEUR RADIO EXHIBITION

We were very glad to hear from P. A. Thorogood, G4KD, organiser and manager of the International Radio Communications Exhibition, that all stand space available has now been taken. As last year, the Show will be at the Seymour Hall, Seymour Place, in the vicinity of Marble Arch, London, W.1, from October 30 until November 2 (Wednesday to Saturday). Though the Hall itself is ideally suited to our type of Exhibition, day-time parking in the neighbourhood is pretty difficult and those thinking of coming by car are advised to use public transport! The exhibition is open from 10 a.m. till 9 p.m. daily for the four days, admission is 3s. and (if you live in the U.K.) you should find loose in this issue your lucky-number ballot card. This is acceptable for the draw only if it is dropped in the box on the "in and paid" side of door—it could

win you a very fine communications receiver, and we understand that a certain number of lesser prizes will also be given. Though the draw will not be until the Saturday evening, this will not matter if your name, address and callsign (if any) are written clearly on the ballot card. Winners get their prizes whether they are there or not (but it is better to be present to carry your prize away). We look forward to meeting many of our readers, new and old, on Stand 19, which is half-left from the entrance, on the main aisle. Whether you come to this Exhibition to buy or to look, remember that it is also the most important and by far the largest of the conventions of radio amateurs to be held in this country during the year—and if you want to avoid crowd conditions, come on either Wednesday or Thursday, in the early afternoon.

VHF TRANSVERTER AND POWER AMPLIFIER

SIMPLE SSB UNIT FOR TWO METRES

C. BOWDEN (G3OCB)

The Sideband PA unit described here—consisting of a transverter, or mixer, driving a linear RF amplifier on two metres—is actually the VHF section of our contributor's SSB exciter-amplifier for the HF bands; the latter is to be covered separately in a forthcoming issue. Since so many readers already have Sideband transmitters for the communication bands, it was considered that the practical application of the transverter principle, now so much discussed, would be of greater interest, not only to them but also to potential two-metre operators, than going into details of the sideband exciter itself at this stage. The point is that anyone already possessing either a commercial or a home-built SSB Tx capable of giving SSB/CW output on 14 mc can get going on two-metre Sideband (or CW) with the unit described here. A photograph of the author's complete assembly appeared on p.298 of our August issue.—Editor.

THIS unit is quite straightforward. Only one chassis is used and normal VHF technique and circuitry are employed throughout—see p.417.

The valves in the oscillator/multiplier chain are a 12AT7 (V4) and an EL91 (V5), the first half of the former being employed as a Squier third overtone oscillator and the second half as a tripler. Output from the latter is near 65 mc, doubled by the EL91, the resultant being fed to the 5763 high level mixer (V1) via the series-tuned anode circuit L9, C21.

A 14 mc drive, SSB or CW, is fed to the screen grid of the mixer at a very low level via the tuned circuit L1, C1 and the resulting output at 144 mc is again selected by a series-tuned circuit L2, C5, and then link-coupled to the grid circuit L3 of the Class-A driver valve V2, which is another 5763. The anode circuit of the driver is also series-tuned and once again link coupling is employed to feed the drive power to the PA grid circuit.

The anode circuit of the QQV06-40A PA employs the coil-condenser assembly from an ex-WD SCR-522 transmitter (which is not the most efficient of circuits at this frequency). However, performance is quite satisfactory, although more output could probably be obtained by using tuned lines or some similar type of conventional VHF tank circuit.

Stabilised screen voltage is essential for correct operation of the PA and 300 volts has proved quite satisfactory. The anode can be run at anything from

500 to 1,000 volts, the latter voltage being used at G3OCB. This permits the valve to take inputs up to about 200 watts p.e.p.

The first transverter built by the writer had a pair of 5763's in a balanced mixer, the coupling between the mixer and PA grid being very tight. Due to the poor selectivity of the circuit a large number of quite strong spurious signals were detectable even several miles away, so the thing was immediately scrapped and the present unit built. This incorporates the multiple tuned circuits as already described and results are much better, no spurious signals now being detectable. (In this connection, listening on the station receiver can be misleading as the large number of mixing and VFO frequencies present give rise to many inter-modulation products when the high powered PA is switched on—get a local station a few miles away to check the signal.) The series-tuned circuits used in the anodes of V1 and V2 probably account for the reduction of spurious signals more than any other factor because of their good selectivity at this relatively high frequency.

Coupling adjustment of the link coils between driver anode and PA grid is quite critical and care should be taken to position the links for maximum grid drive, retuning the circuits after each adjustment if necessary. When the transverter is correctly adjusted the plate current of the PA in the SSB driver (to be described) should barely flicker when driving the transverter to full input. With carrier inserted and the drive-control advanced, the QQV06-40A can be driven into grid current if all adjustments have been correctly made and the unit is functioning properly. The output link is series-tuned, by C13, permitting load adjustments to be made quite simply.

The PA anode current is continuously metered, while the screen and grid currents can be checked by switching M1 from one to the other. Bias control R8 is mounted on the front panel and allows the PA standing current to be set at will should the latter change due to mains volts variation or any other cause.

The relay RL1 is operated from the main exciter by the aerial relay 12-volt supply. The function of RL1 is to mute the transverter while receiving, as otherwise PA shot noise and stray radiations from the mixers and multipliers can cause severe interference. Other similar c/o control circuits could be used.

Adjustment

The PA anode and screen voltages should be removed. Then, using a GDO, or LF and VHF receivers, the oscillator/multiplier chain should be set up.

With a 7.225 mc crystal inserted in position X1, L7 should be set to about 21.7 mc, L8 to around 65 mc and L9, C21 to roughly 130 mc. The bypass capacitors C4, C17 and C18 provide grid current metering points and with a milliammeter connected from condenser to chassis the currents obtained are 0.2, 0.7 and 0.7 mA respectively (in the author's unit).

A 2-metre receiver may then be switched on and the SSB exciter should be set for 20m. operation and

coupled into the transverter. The carrier insertion control should then be advanced and the drive turned up until the anode current of the exciter PA valve just lifts above its standing value.

The receiver should now be tuned across the two-metre band until the carrier output from the mixer stage has been identified. To begin with it may be necessary to position the receiver aerial quite close to the transverter unit in order to obtain sufficient coupling. Once the signal has been located the coupling can be progressively reduced as the tuned circuits L1, C1—L2, C5—L3, L4, C9 and L5, C10 are brought to resonance. After these adjustments it should be possible to draw grid current from the 2m. PA and the link circuits may now be adjusted until this is a maximum. The current obtained will depend on the setting of R8, to some extent (self-biasing action).

After the drive has been brought up to its maximum value the carrier insertion control should be reduced to zero and power may be applied to the two-metre PA. The anode circuit should be resonated by rotating C12 and the PA should remain stable. *If it is not, the fault must be rectified before proceeding further.* If, however, all is well, a dummy load should be connected to the PA and, with the carrier insertion control again advanced until the 2m. PA exhibits about 150-200 mA, C12 should be swung to check for stability. (Make this check rapidly to avoid damaging the valve.)

When the PA is stable it can be tuned and loaded as described in the following notes, and put to work. The unit has been in use for over twelve months and reports have been very satisfactory. There are still some operators on 2m. who cannot or will not resolve SSB, but the mode is rapidly gaining favour. Providing that the receiving operator has a suitable Rx, SSB is no harder to tune on two metres than on any other band and under conditions of heavy QSB or low signal strengths it is much more effective than AM. The system overall as described here has, of course, the advantages of VFO control, making it much easier to join nets and to avoid zonal QRM.

Tuning and Loading a SSB Linear without a 'Scope

Although the method now to be described will not lead to perfect results it will enable an SSB linear to be tuned quite accurately without the need for elaborate test equipment.

Provided that the anode dissipation, peak anode voltage rating and peak cathode current rating of a valve are not exceeded, then far more effective use can be made of that valve under SSB conditions without overrunning it. Thus, although 600v. is the normal rating for a QQV06-40 in an AM rig, the peak voltage rating is much higher. Indeed, during AM modulation peaks it may approach 2,400v. In an SSB linear with 1,000v. DC on the plate, the peak RF voltage at full drive will be about 2,000 volts so, despite the greater DC voltage on the valve, there

Table of Values

Fig. 1. Circuit of the G3OCB Two-Metre Transverter

R1 = 10,000 ohms	C1, C5,
R2 = 33,000 ohms	C9, C21 = 3-30 μ F
R3, R5,	C3 = 47 μ F
R16, R18 = 22,000 ohms	C8 = 16 μ F elect.
R4 = 220 ohms	C10 = 0.5-3 μ F
R6 = 1,000 ohms	C12 = 15 μ F butterfly
R7 = <i>shunt to read 20</i>	C13 = 50 μ F preset
mA	C16 = 47 μ F
R8 = 50,000 ohms w/	C22 = 22 μ F
wound pot'meter	V1, V2 = 5763
R9 = 100,000 ohms	V4 = 12AT7
R10 = 22,000 ohms	V5 = EL91
R11, R12,	V3 = QQV06-40A
R13 = 4,700 ohms	X1 = 7.225 mc, or for
R14 = 18,000 ohms	2m. Zone
R15, R17 = 47,000 ohms	M1 = 1 mA
R19 = 470 ohms	M2 = 200 mA
C2, C6,	S1 = DPCO, meter
C7, C11,	switch
C19, C20 = .001 μ F	RL1 = 12v., 2-make con-
C4, C17,	tacts
C18 = .0005 μ F feed-	RFC = 19 ins. 34g. wound
through	on resistor body
C14, C15 = .01 μ F	SK1 = Coaxial sockets

COIL DATA — TRANSVERTER and PA UNIT

- L1, L3, L8: All on $\frac{1}{4}$ -in. dia. Aladdin type polystyrene formers.
- L7: On $\frac{3}{8}$ -in. dia. Aladdin type polystyrene former.
- L1: 20t, 34g. enam. close wound, tuned by dust core; link winding 3 turns, overwound at cold end.
- L2, L4, L9: 5t, 26g. tinned copper, $\frac{3}{8}$ -in. dia. self supporting; one turn spacing; link winding 2 turns, 26g. $\frac{3}{8}$ -in. dia.
- L3: 4t, 26g. tinned copper; winding length $\frac{1}{2}$ -in. and ends $\frac{1}{2}$ -in. long; tuned by brass slug. Link winding 2 turns at cold end.
- L5: 2t, 20g. silver plated; $\frac{1}{2}$ -in. gap between turns. Coil $\frac{3}{8}$ -in. dia.
- L6: 4t, 16g. silver plated; $\frac{3}{8}$ -in. dia. and $\frac{1}{2}$ -in. gap at centre (can be ex-SCR-522 tank coil).
- L7: 22t, 26g. enam. close wound; tap at 5 turns; tuned with dust core.
- L8: 8t, 26g. close wound; tuned with dust core.

is still quite a good safety margin in terms of the peak rating.

Of course, when such high voltages are used the average anode current must be held to a much lower value and during tuning adjustments drive should only be applied for a few seconds at a time to avoid overheating the valve. To prevent bottom-bend distortion the quiescent anode current, *i.e.* value of anode current with no grid drive, should always be set to as high a value as possible after allowing some safe margin for dissipation. As a rough guide, the product of the anode voltage and anode current should equal about 70-75% of the rated anode dissipation for that valve. Under speech input conditions the average dissipation should not then be excessive.

When initial tuning and loading adjustments are being made the PA voltage may be reduced, but during final setting up the working voltage should be applied because the correct value for the loading condenser at the lower voltage may not be right for the higher voltage.

Before attempting to load the linear it is necessary to have certain information pertaining to that

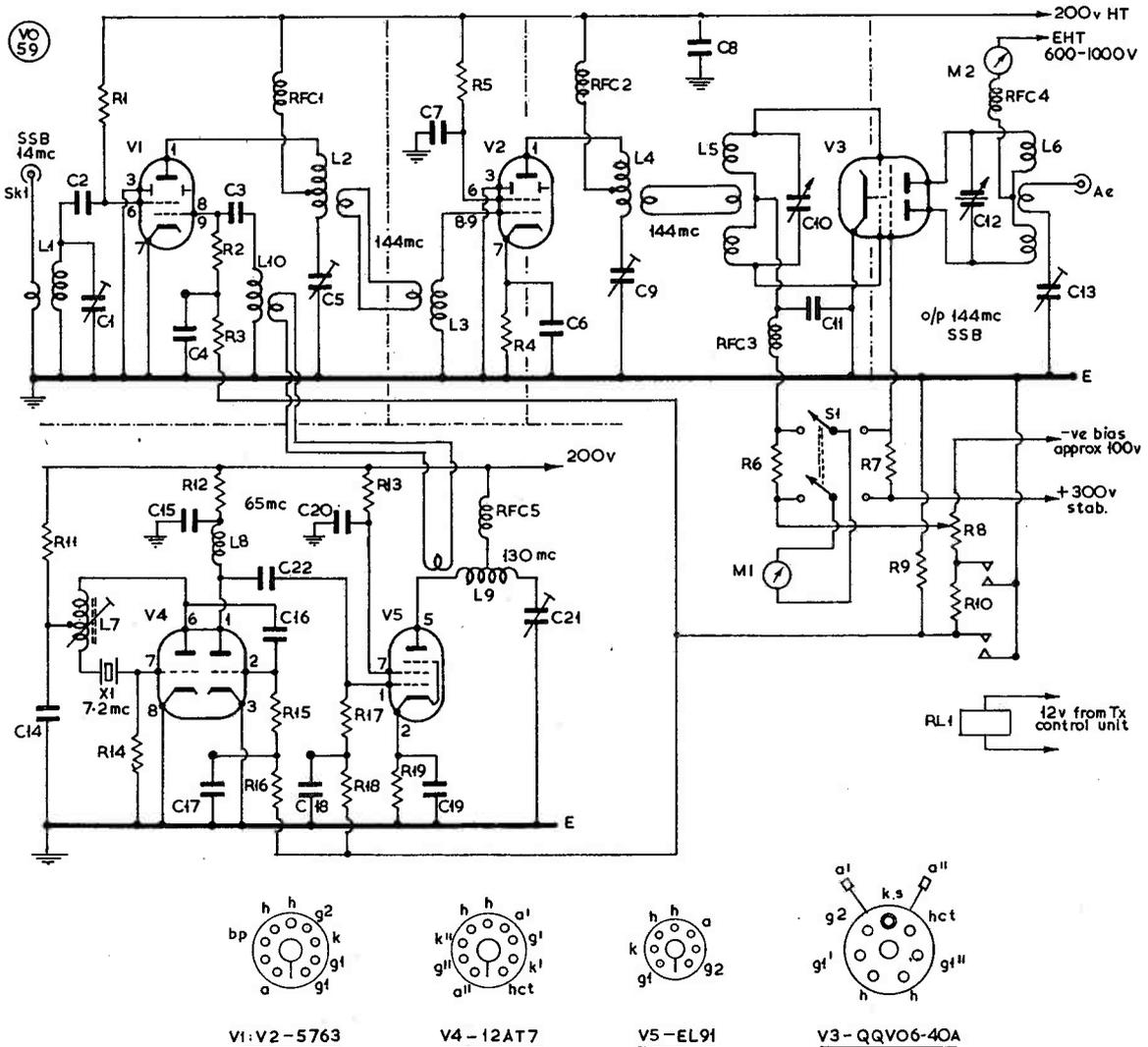
particular valve for the mode of operation which is to be used. For example, consider typical figures for a small tetrode rated at about 20 watts anode dissipation run in Class-AB1, with a screen rating of 3 watts :

Anode Voltage (V_a):	500 volts	1,000v.
Screen Voltage (V_{sg}):	200 "	200v.
Grid Bias (V_g):	-50 "	-65v.
Anode current (I_a):	115 mA	105 mA peak
Screen current (I_{sg}):	14 "	13 mA peak
Quiescent anode current (I_q):	30 "	15 mA

As V_a is raised the grid will have to be made more negative in order to reduce I_a in order to keep the quiescent dissipation to about 70% of maximum, which will cause some slight reduction in the peak screen and anode currents. The table clearly shows this effect.

Tuning Procedure

- (1) Compute value of standing current which will result in plate dissipation of about 70%.
- (2) Turn up carrier and drive controls until I_a is about 50% of the peak value and resonate the tank



V1-V2-5763

V4-12AT7

V5-EL91

V3-QQV06-40A

Fig. 1. Circuit complete of the two-metre transverter and linear PA for two metres, designed and described by G3OCB. The basic idea was discussed originally in the July '62 issue of "Short Wave Magazine." Here is its practical expression. The 5763 at V1 is a mixer, at low level, combining the 14 mc SSB input (which can be from any existing transmitter capable of giving SSB drive on that band) with the output of the 130 m oscillator section V4, V5, to produce an SSB signal on 144 mc. This is passed to V2, another 5763 as buffer amplifier, to drive the QQV06-40A PA stage V3 to about 200 watts p.e.p. The inherent stability of any good SSB transmitter on the 20-metre band means that the VFO facility becomes available on two metres — and it is this, as well as the much improved readability of a Sideband signal under poor phone conditions, that gives the SSB operators on two metres their advantage over CC/AM stations.

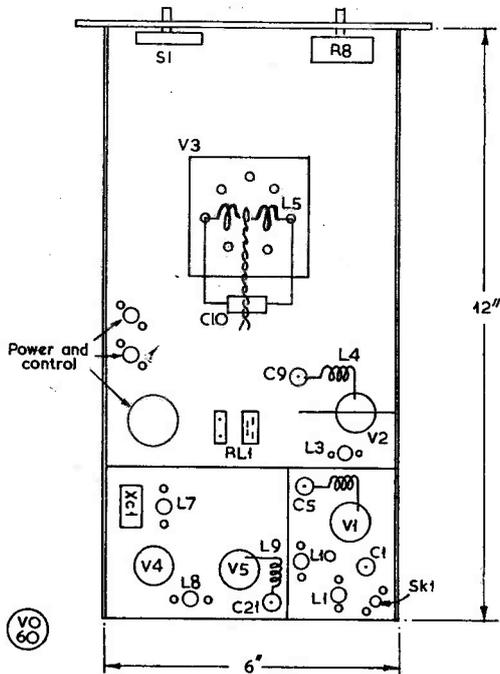


Fig. 2. The chassis layout adopted by G3OCB for his two-metre transverter/PA. While there is no need to follow this exactly, it is a convenient practical arrangement.

circuit, watching the screen current closely while this is being done. If the screen current starts to rise to a higher figure than is tabulated for that valve, increase the loading. This will reduce the screen current. Screen current is a very accurate indication of the degree of loading and it is the *screen current peak* rather than the extent of the anode dip that indicates resonance and the degree of loading.

- (3) Increase drive in steps, at the same time increasing the PA loading so as to hold the screen current below the maximum rating. Care must be taken to do this rapidly, a few seconds at a time, as the anode current will now be large and the valve could sustain severe damage if this high drive position is prolonged.

The object is to continue this process until the following conditions obtain:

- (3a) Drive advanced until grid of the PA is just on the point of drawing current.
- (3b) The screen current will be at the tabulated peak figure.
- (3c) Anode current will be at the tabulated peak figure.
- (3d) The anode current off resonance should be about 20-25% higher than its value at dip. A small dip may indicate too much loading.

The product of the screen voltage and screen current should still be within the rated screen

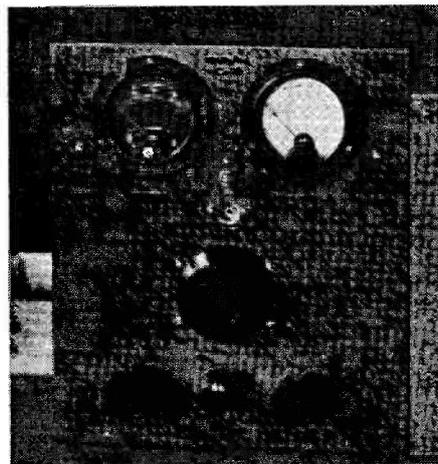
dissipation, e.g. $14 \text{ mA} \times 200\text{v.} = 2.8 \text{ watts}$, but the anode (assuming 60% efficiency) would be dissipating well in excess of 20 watts (40% of $105 \text{ mA} \times 1,000\text{v.} = 42 \text{ watts}$). Of course, these ratings are continuous only if the valve is driven by a single tone input, as when tuning up, so the reason for rapidity during these adjustments is obvious. Note that at lower levels of grid drive during preliminary tuning adjustments the anode may *rise* rather than dip at resonance.

Loading Considerations

A PA which is too lightly or too heavily loaded will cause distortion of the waveform resulting in splatter. After the loading adjustments have been completed the carrier control should be turned back to zero and speech into the microphone should result in SSB drive causing the PA anode current to vary rapidly. The drive control should now be adjusted until the grid current meter *just* flickers on speech peaks. If the PA is not driven as hard as this there will merely be some loss of output power—but, on the other hand, overdrive as indicated by excessive grid current should be avoided as serious flattening of the waveform will occur causing splatter and reducing rather than improving intelligibility.

The anode current meter should *not* be used to indicate whether or not the PA is being driven correctly when SSB is applied. Under these conditions the time constant of the PA meter may vary so much from meter to meter as to make it impossible to interpret the meaning of the needle as it swings (in an actual test, one meter gave a swing of 30 mA while another gave 100 mA).

If the PA is tuned and loaded as described then SSB drive to the point of grid current should result in quite satisfactory PA efficiency and a clean signal. Although the procedure outlined may appear complicated, with practice and a knowledge of the general positions of the controls the whole process can be carried out in less than half-a-minute.



The two-metre linear RF power amplifier for two metres as built by G3OCB and described in the text.

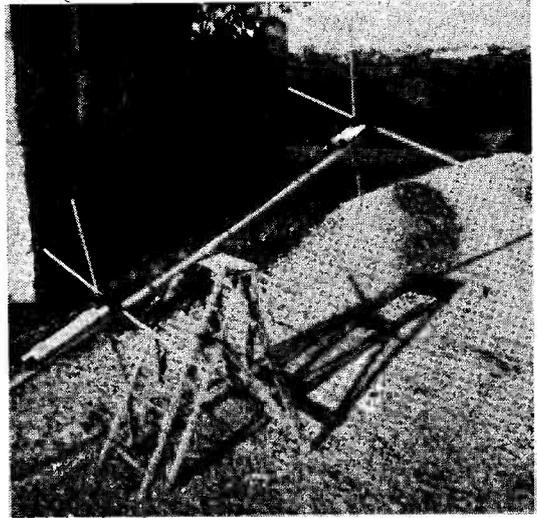
TURNSTILE FOR TWO METRES

The odd thing about the VHF aerial assembly known as the Turnstile is that it does not rotate—it doesn't need to, because it is essentially an omnidirectional array, with a circular polar diagram. The name derives simply from the configuration of the elements (two pairs of dipoles at right angles). The gain in any direction over a single dipole is about 2-3 dB.

Shown here is the two-metre version now being offered by J-Beams, Ltd. of Northampton, the well-known firm of commercial aerial system engineers, of which G2HCG is a principal. The J-Beam Turnstile is of excellent design and construction. The four dipoles are split into 8 separate screw-in elements, with hard polythene insulation at the feed points. Stack spacing is 0.66 w/l, with separate baluns on each stack, all flexible connections being protected in p.v.c. sleeving. The basic assembly requires about 10 ft. of masting, and this can be supplied, together with any chimney lashings (all-same TV aerial mountings) that may be needed. The array finishes as a strong, good looking job.

As to results, these are entirely satisfactory within the gain limitation—the point being, of course, that this is a two-metre system which is best used where it is either impracticable to rotate the mast, or where a low-gain aerial is acceptable in return for the omnidirectional facility. In many cases, it would be worth having a Turnstile for general working, in addition to any existing beam.

At A.J.D.'s, the Turnstile was put up to a height of 35 ft. on a fully insulated dural mast which happens also to be rotatable. This enabled the aerial to be tested for omni-directivity, the result of



General appearance of the J-Beam 2m. Turnstile as supplied, assembled ready for erection. The two pairs of dipoles at right angles are spaced at 55ins., or 0.66 w/l. Each of the eight elements is 18ins. long and there are separate baluns on each stack. The radiation pattern, transmission or reception, is virtually omnidirectional, and the array shows a gain of perhaps 3 dB over a single dipole. The whole aerial is extremely well designed and constructed, with full weather protection.

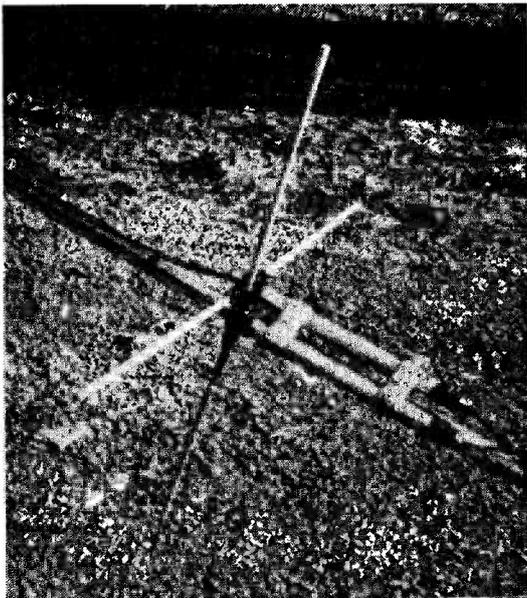
which test being that the beacon signal at 50 miles remained constant through a full rotation. Because the mast is insulated it can itself be used as a vertical radiator on the HF bands, the Turnstile assembly constituting a degree of top-loading. As a matter of interest in this particular connection, the base insulator consists of a hard-glass cup, inverted, and fitted in a flower-pot held on bricks—with, of course, draining holes to keep the insulator free of water. (The only snag was that with the amount of rain we have been having since the installation was completed, the drain-holes had to be enlarged to get the water away fast enough!) In fact, however, the best way to mount the Turnstile would be on a chimney-stack, using TV aerial fastening.

THE DECEMBER R.A.E.

Those who propose taking the Radio Amateurs' Examination to be held on December 13 are reminded that their applications, with the 30s. examination fee, must be in by *November 1st* latest. The arrangements can usually be made through the local Technical College or Education Authority—but see p.327 August SHORT WAVE MAGAZINE for fuller details.

INTERESTING POINT

In a radio programme to which we happened to be listening the other day, in connection with the Navy's recent mine-sweeping operations in enclosed waters, it was mentioned that a current of 2,600 amps. is passed through the trailing cables used to create the field for exploding the mines.



Lower crossed-dipole elements in the J-Beam Turnstile assembly for two metres, showing matching sections.

DX COMMENTARY

L. H. THOMAS, M.B.E. (G6QB)

IT must be obvious to anyone who spends any time on the HF bands that the DX man's major trial is no longer what we loosely call "conditions," using that word to signify the *natural* hazards. Propagation, as we approach the sunspot minimum, has changed the bands, for us, only to the extent of virtually wiping out 28 mc as a DX band. If we apply that same word "conditions" more rationally, to describe the actual *condition* of our bands, we have far more cause for complaint. We hate to talk about "enemies"—Amateur Radio isn't a war, however some of its misguided devotees may treat it. But it's about the only word to describe the masses of intruders, invaders, infiltrators who make our bands—even the "exclusive" ones—so impossible at times.

For instance, whatever happened to that section of the 14 mc band between 14300 and 14350 kc? Two or three years ago, if you wanted a sideband contact, that was where you had to look. And the ARRL even went to the trouble of recommending the U.S.A. stations to leave the top 10 or 15 kc of that section clear for DX SSB.

Nowadays it seems that the whole 50 kc sector is full of commercial jingle-bells, and for much of the average day you will not find a readable SSB signal there at all.

And at the other end of the same band (we now quote from the WGDXC Bulletin for September 11) . . . RTTY on 14001, 14010, 14015, 14035, 14040, 14085, 14090, 14095, 14105, 14110—same place, same date, same time. . .

You have to have your share of dogged perseverance to stay on the band, looking for weak signals, through that lot! But lots of us still do, while wondering whether it's all worth the trouble.

Whereas we have succeeded in almost overcoming the hazards of ionospheric variation by improving our transmitters, receivers and aerial systems, this doesn't help much against the commercial invasion. What, then, is to be done? Many years ago the ARRL through *QST* suggested that a limited number of stations should be licensed for powers as high as 10 kW, mainly for the purpose of coping with intruders! Well, we doubt whether any of the "big boys" over there actually use 10 kW but some of them *sound* as if they do, which is what matters. Those few tremendous signals are rarely heard on the bands (there are no new ones for

These remarks, naturally, apply only to the exclusive amateur bands. If it were tried on the "shared" bands, we have no doubt who would come off best. Meanwhile, on the "exclusives," make sure that you do all your tuning-up operations on top of one of the gate-crashers; talk it around and get everyone doing it; and when you work someone with very strong signals it might be a public-spirited gesture to QSY on to one of them. Who knows—you might actually cause a little QRM.

DX Around the World

No shortage of real DX activity this month, with some quite rare pieces in action *and* workable. Gus Browning, having returned for a while to AC4, handed out many more QSO's than on his first brief sortie—lots of Europeans worked him this time, on various

REPORTING ACTIVITIES ON SIX BANDS

them to work), but when they are, it is quite a phenomenon, and we hazard a guess that they drop as good a signal into any part of the world as some of these commercial pests which shouldn't be in our bands at all.

Public-spirited DX-ers with super-signals, please note! Your grip on future fame would be assured if you were known as the Giant-Killers . . . and perhaps the award for "Shifting Ten Commercials" would be more worthwhile than some of these "Worked All Bikini Atoll" things.

Seriously, though, it is suggested that the amateur know-how which produces some of these colossal signals would be capable of coping with at least *some* of the intruders, merely by being able to produce competing signals at the receiving end, at certain times of day and in certain states of the band.

bands, including *Forty* and even *Eighty*. Gus's home station, W4BPD, was famous before the war for its specially-erected rhombic aimed at AC4YN . . . and now Gus has realised his ambition of working from the other end, whence he has probably handed out far more QSO's than all the previous AC4's put together. Up to mid-September he was operating AC7A from Bhutan, and awaiting his visa for AC3, Sikkim (but see later . . .).

KØGZN has been assigned the calls PJ5SA and PJ5SB for Saba Island—"a small volcanic island whose total population lives inside the crater" . . . New applicants for licences in Swaziland will apparently be given the prefix SD1 . . . The Kuria Muria Island sortie, when last heard of, was booked for the end of October, but may possibly be there right now . . .

ZS2MI (Marion Island) is active at week-ends, distinguished by a T8c note.

WA6FXO/KP6 has been putting in many hours on the air, usually 14250 kc SSB; probably left by now . . . MP4TAX (HZ1AMS) has been on 14265 SSB, around 2200 . . . Aves Island (YV0AA) will be activated during both sections of the CQ Contest.

Anguilla Is. (VP2) is the subject of much gossip. VP2AJ is said to have been there (QSL via W6JFG); a DX-pedition is mooted for October 9-27, handled by K4UTE, PJ3AO and VP7LG; and, during the first week in October, K8ONV (YL op.) is stated to be going there; finally, operation thence, by VP9BN, is promised during the CQ Contest (phone week-end, October 26-27).

St. Pierre (FP8) has been considerably de-valued by tremendous activity on the part of FP8AS (W2EQS) and FP8CK (W2JAE) for much of September. FP8BY is yet another expected to show up, the operator being K7AEJ/DJ0IR /9A1IR.

Other interesting ones active in mid-September included VK9LA (Cocos-Keeling), AP2AR (East Pakistan), ZD7CE, HS1L, JZ0HW, ZD8HB, 9N1DD and ZD3AL. KS6BA is the new call of K6CQV/KS6; KC6BO has been worked by many G's, one or two on *Forty*.

News from Overseas

5N2JKO (Zaria) has been making history on Top Band. The 50 watts which he is allowed has brought "firsts" with DL1FF (August 25), W1BB (September 1) and GI6TK (September 2). G3GRL, 3IGW and a few other G's heard, but no QSO's to the time of writing. He is running a K.W. Vanguard and a 530ft. wire. On *Eighty* he is active every Tuesday, Thursday and Saturday, 0300-0500 GMT, either on 3505 CW or 3785 kc SSB. *Forty* is also used a lot, but whenever he calls any real DX he is besieged by LZ, YO, YU and SP calls; Europe is best from 2200 onwards. *Twenty*, of course, is good all round; *Fifteen* is open to Europe until 2000, but it takes a contest to stir up any activity. Finally, on *Ten*, 5N2JKO has worked G, GI, GM

and many other Europeans, mainly 1500-1700. So there it is—our first six-band report from 5N2, and a very good one, too!

VP8GQ's doings are reported by G3PAG, his QSL manager. Peter is another six-band man, and his outstanding contact was with DL7AA on *Ten* (September 8, 589!). Another unusual one for the time of year was with W2KQT on Top Band (August 26). G3PAG points out that VP8GQ has been on SSB since 1961 . . . but he is mainly a CW man, of course. (QSL's to G3PAG at 139 The Fairway, Leigh-on-Sea, Essex . . . some have been wrongly addressed).

5B4RF (Famagusta) reports excellent conditions to the U.K. on Top Band, August 31 from 2130 onwards. He logged G3GRL, 3OQT, 3RAU, 3RRU, 3IGW, 3PQA, 2DSF, 3OUV, 3OLI, 3RQX, 5AQ, G1NZZ and GW3JI. PA, DL, OK and ZB1 were also heard, together with many G's too weak to copy. 5B4RF is now active on 160m. and has already worked G3GRL, but for that night's work he had access to a Racal Rx, which must have helped . . .

VS1LV, via G3WP, passes on the word that Radio Ceylon are

very anxious for reports on their broadcasts (15333 kc) between 0630 and 0730 GMT. They started up on September 2, and reports of strength, readability and fading would be appreciated by Radio Ceylon, Colombo.

Ten Metres

Whatever the conditions may be like on the 28 mc band, at least some interest is being shown in its existence. One of the best contacts recorded has already been mentioned—DL7AA to VP8GQ; but even more surprising (because of the East-West path) was DL7AA's other notable one—with AC7A! Rudy must have been using the band pretty consistently while everyone else has ignored it, for his country total for 28 mc is 211 . . . much higher than any G scores we have heard of.

G3IDG comments "There's life in the old band yet—and for the fourth month running . . . the only DX has been on phone (CR6BX at 1910, and 5H3IW at 1740 and 1815), but 11 countries have been heard on CW."

The same two DX stations turn up again, for G3MBL raised CR6BX (1904) and G3LHJ worked 5H3IW—both on phone. G3NOF got VQ4AA on SSB when the



Station W0MLY, George McKercher, Box 185, Perry, Iowa, who is active on the DX bands and a holder of our PRA and WBC Certificates. He is also known on the 160-metre band.

band seemed dead at both ends, but after a contact on 14 mc they decided to try, and it worked (1730).

For those who aspire towards doing something that seems impossible:—K6HME is putting out a continuous transmission on 28-6 mc with a 600-cycle modulation, and breaks for identification. He will be on until November 16. This is for the purpose of investigating 28 mc propagation.

Fifteen Metres

Lack of activity is the main trouble, as ever, on the 21 mc band. There is nearly always some sort of DX there, if you look hard enough, but seldom anyone working it! Now that the hours of daylight are shortening, the band will be less and less useful; but it is still worth a look at any time between 0700 and 1900.

G3NOF found conditions to Africa good at 1000 and again in

the evenings; and to South America during late evenings. On AM he worked ZE2JA, 2JZ, 8JN, ZS1MW, 6BDU, 6BFU, 9G1CC 6O1KH. On SSB he contacted ZD7BW. G3LHJ raised ZD7BW, HK3LX and some PY's on CW, while phone fetched in EL1H, VS1LV, 5H3IW and 3JI, 5U7AC, 5X5JK and ZS's.

G3MBL (phone) worked the two 5H3's, VQ2IE, CR7FP, PX1MO, 9G1DM, 9Q5TH, 5N2LJM and K1SDS/AM . . . all with 25 watts to a 2E2B, and a home-brew two-el. beam.

G5CP tried mobile on this band with 35 watts input to a K.W. Valiant, and on August 28 worked OR4F (Belgian Antarctic) on CW; a few days later he raised PY7ABY. Both QSO's were on a plain 11ft. whip, and G5CP was duly surprised—and pleased.

Still further QRP news (or perhaps this is *QRPP*) from G3NYQ, who, with 6 watts of SSB, contacted VS9AAA, 5N2JKO, EA8CR, ZD7BW and a PY. With the same rig, using a mere 3 watts of CW, he made it with 5B4CZ, CR6DX, CR7IZ, VQ2BL, HB1ABS/FL and some 4X4's. A Mosley TA-33 Jr. on top of a 40ft. tower helped things along.

If you can do this sort of thing with 3 watts of CW or 6 watts of SSB on *Fifteen*, surely the high-powered brigade ought still to be working worldwide DX? Some-one please explain.

Twenty Metres

A fair sprinkling of exotics has kept activity high on this band. When there are a couple of nice pile-ups in progress, the rest of the band seems beautifully quiet (except for the RTTY already mentioned). Some useful Pacific DX is now breaking through in the mornings (KP6, KS6, KJ6 and the like); the KL7's and VE8's are either there in full force or completely absent; VK's and ZL's show up at intervals; and things seem generally lively.

G3PEK remarks that KC6BO was putting in a 599 signal which held up for a full two hours; he worked him, together with AC7A, KR6BY and 6NG, EP2RC, 9M2GJ, UWØIN and four OHØ's—all on CW.

G3BDQ, using the transmitter described this month, swapped CW with JT1CA, 6O1ND, 5H3HZ, VQ8AI, HM5BF, KC6BO, CR9AH, VR2DK, ZD7BW, FP8AS, VK9LA and AC7A.

G3NYQ, with his 6 watts p.e.p., worked SSB with W5JDX/VP9, F9RY/FC, MP4BBW, YV5BPG, VE and W, FP8CK and LX3UL; CW fetched in KV4AA and VP8GQ. G3WP, on CW only, collected EP2RC, KG4AM, VP2AV, VS1LV, OH5TK/Ø, YV4BE, UI8, UA9, W's and VE's.

G3RDC, having received a 579 from KC6BO on 75 watts, reduced to just under 30 watts, called him again two hours later, and got the same report. He says "If you can do this with QRP, it would be interesting to see how the big DX boys would get on with one-tenth of their normal power (*i.e.* about 100 watts!)" His 75 watts to a dipole also raised KR6BQ, KX6BK, KG4AM, ZD8HB, HC1DC, VP2MM, FY7YJ, 6W8AB, JT1CA, VP8HD, AC7A, AP2AC, BV3NO, VP8GQ, VS9MB, HL9KB, KH6, KL7, VE8 and many more.

GM3JDR, who has now worked about 250 on SSB, sends a long list which includes AC5A/4, AC5A, AC7A, CR5AA, HL9KH and 9KR, HS1X, JA1BRK/JB8, JT1CA, KM6CE, TU2AU, VK9NT, VR4CU, XW8AL, YS1O and 1SRD, ZD7BW and 7SE and many more lesser lights. CW accounted for AC5A/4, AC5A, AC7A, FP8AS, JA's, KC6BO, PX1PI, UH8, UJ8, VK9NT, 5X5JG, 6O1MT, 9M2GJ and SM6BQL/9Q5.

GC2HFD/A, operating from Alderney, concentrated on SSB and made many hundreds of W QSO's, as well as working ZP5CF and 5ET, PX1GA, HC1FG, OA1J and 4CV, YS1RRD, MP4BCC, PJ2AA, 5N2JKO, VS1LQ, 3A2CP and 9N1DD. CW brought in VP2MM, KV4AA, JA1ZZ, OHØ and GC3PAI/A (Sark)!

G3RFS worked CW with ZD8HB, 5X5IU, 6O1ND, EP2BQ, 5N2JKO and 2ACB, ET3USA, VS9AQ and 5B4's. G3LHJ, same mode, raised KC6BO, KR6NG, VQ4IV, VP8GQ, VU2ND, ZD8WF, 5N2JKO, FY7YJ and 5X5IG; on phone, 9M2BI, VS1LV and 5N2SMW.

FIVE BAND TABLE

Station	7 mc	14 mc	21 mc	1.8 mc	3.5 mc	DXCC Total
G3FXB	164	290	270	9	105	314
G2DC	150	292	273	14	103	313
G3FPQ	139	273	258	28	120	301
G3IGW	102	132	127	28	53	184
G2YS	99	187	131	22	75	210
G8VG	88	160	88	12	38	182
G3PEK	78	106	48	12	34	119
G2BLA	77	100	99	10	40	153
G3KMQ	65	189	77	13	47	210
G3DO	64	301	223	10	73	313
W6AM	59	318	87	8	30	325
G3RFS	56	109	30	7	9	112
GW3CBY	56	81	34	20	37	103
G3LHJ	54	153	180	12	24	216
G3NFV	44	112	125	17	57	177
GW3PSM	38	56	25	1	26	77
G3NYQ	38	42	31	12	31	69
G3IDG	27	53	64	11	17	94
G3NOF	23	206	187	2	33	249
G3RFE	4	67	69	1	25	112

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)

G3NOF heard VK's at 0700, 1300 and 2300, but found conditions best to Central and South America, with a few openings to Asia in the early afternoons. He worked SSB with AC3PT, HC2JT, PJ2AA and 3AO, PX1MO, PZ1CE, VP8GQ, VS9MB, YS1RRD and 2SA, ZD7SE, 5N2's, 9G1DY and 9M2DQ. Heard, but (alas!) not worked were KM6BI, KS6BA, KX6BU, WA6FXO/KP6 — all around 0800 — and VK9DR (14103), VP3HAG (14115) and HS1B (14254).

Forty Metres

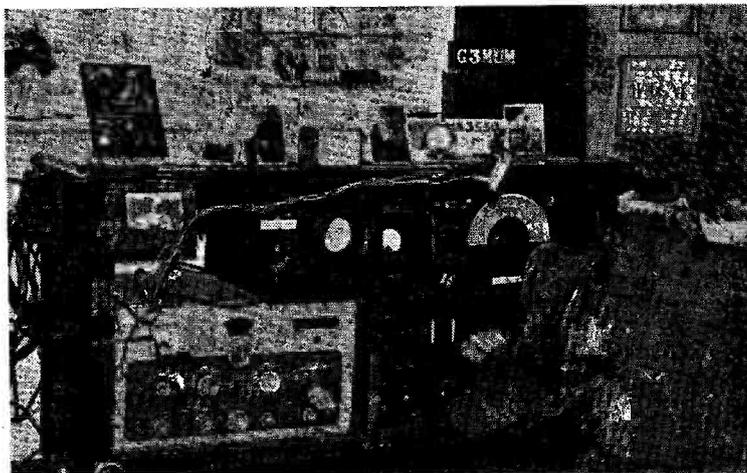
The types who take one look at 7 mc, shudder at the mess and go QRT, must feel a little pained at what they are missing, when they read the next few paragraphs. It just shows what perseverance will do. For instance, G3PEK winkled out the following, all on CW: 1900-2100 GMT — UM8KAA, VU2PF, CT2BO, FP8AS, VS9AAX, VQ4IV, JA6AK, HL9KH, VP8GQ, VK4SS, 5JE and 5KO. 2100-2300 — VP6PJ, EP2RC, UAØAG, KV4CI, PY's, VK5MY and W's. Gotaways included BY1PK (599, with half the world calling him), VP2MV, PZ1BO, HK7AJF, 5N2's and lots of VK's. The earliest time for raising W's was 2020.

G3PIT says the only really good ones (again on CW) were ZS1A, at 0410, and ZP5CF at 0430. However, around 0700 he heard VK or ZL every day and worked eight of them. Best time for ZL, 0610-0735; for VK, 0640-0745. That QSO with ZP5CF gave G3PIT his 100th country on Forty.

The high spot for G3GGS (still CW) was AC5A/4 (0020); but he also worked AC7A (0005) with a 579 both ways. Others worked — VP3YG, CR7IZ, FP8AS, VE8RG, 9Q5AB and ZP5CF (589 both ways at 0005). Heard were HK's, YV's, 5N2ACB, ZD7BW, BY9SX, VP8GQ and 9X5DW.

GI6TK remarks that Gus, AC7A, was an excellent signal on 7003 kc at 1700. (Actually he came up on that spot nearly every day and often worked quite a few Europeans on the band between 1700 and 1800.)

Still not many reports for *Forty*, but what stuff there is, we think



G3MUM, the well-known station operated by Peter Odell (who only has foot control due to almost total paralysis) is at 20 St. John's Grove, Redcar, Yorks., and is now equipped with a Heathkit DX-100U. He also has various items of gear made for him by G3BNM and G3INP. Having now been on the air for five years, G3MUM has filled 11 log-books, representing about 130,000 contacts with some 13,000 different amateur stations.

you'll agree, is pretty good . . . but what a pity that it *all* has to happen between 7000 and 7010 kc, as ever.

Eighty Metres

The coming of September invariably means "ZL's on 80"—and there they were, true to form, nearly every morning. Not always workable, but usually audible . . . and no doubt things will have improved by the time this appears in print. G3NOF reports ZL4LM and 4OD as "very strong signals" on SSB at 0630 (September 16).

GI6TK worked ZD7BW on SSB at 0400 on September 8; DL7AA had a "partly successful" QSO with AC7A, who heard him at 339, but QRM prevented a 100 per cent QSO.

G3PEK, on CW, raised UW9CD and UA9DN late at night; EP2RC (1915 and 2330); VQ4IV (2140); 5N2JKO (0250); VE1ZZ (2310) and VE2NV (0420). He had a shot with VK5KO (2120) and was copied at S5-6, but couldn't hear the VK. The same thing happened with VP8GQ. Other gotaways were 5A1TW, VP9BO and OX3DL.

G3GGS, also on CW, worked VQ4IV (0030), VP8GQ (0020) and 5N2JKO (0350). He missed PY1BTX, PY5XQ and LU8DBX. G3PIT was another successful one

on CW, with VP8GQ (2340 and 0045), EP2RC (2358), PY's (0400), 5N2JKO (0410), EA8BF (0445) and FP8AS (0515).

Our usual 80-metre SWL's maintain complete silence this month, but they will doubtless be on the ball now they've been alerted. There is no doubt whatever that the coming season will be *good*.

Top Band DX

And that last remark applies, in the biggest possible way, to One-Sixty, where things have been happening all summer and are now working up to the usual crescendo. Perhaps the biggest news of the month is that DL1FF has worked VK5KO on a pre-arranged sked at 2000 GMT. Several G's heard this take place, but not one of them could identify VK5KO for certain . . . they haven't all got aerials like DL1FF's full-size ground-plane!

G3REA logged VP8GQ for the first time, and heard a "very hollow and watery" station calling DL1FF, which may well have been the VK. Nearer home, G3REA has maintained his lead on the G3P--/G3R--Ladder, thanks to sundry GDX-peditions.

G3PPE found EI7AP and ZB1WC both causing pile-ups, and

worked the latter . . . G3IGW reports that DL1FF was in QSO with 5N2JKO on August 25, and on the same morning W1BB was 569 as dawn broke; he could not hear 5N2JKO, but had an airmail saying his own signals were 569 at 0430. On September 1, W1BB, 1TX and 2IU were the best W signals; W2IU and ZB1BY were worked, and a report came in from 5B4RF—so for G3IGW the band was open to four continents that morning.

G3GRL finds the "DX regulars" back in force, and managed to work FP8AS at 0405 on September 1. G3GRL is using a 75ft. loaded vertical and is also playing with a balloon at a height of a quarter-wave. And he has been extensively modifying his AR-88 with six crystals, a Q-multiplier and an EF183 front-end . . . so hopes for great things this winter.

GI6TK can claim the honour of the first U.K. contact with Nigeria on Top Band—he worked 5N2JKO on September 2, and also raised FP8AS. He remarks "I wish you would ask the G3R - -

and G3S - - boys to *listen*; when a DX station comes back to someone else, it is not a signal for everyone to start calling the DX station, or CQ DX; they won't get it that way." Yes, let's have a bit of order.

G3PEK logged VP8GQ at 0600 on September 15, and heard him work G3OQT, 3RBP, 3GRL, 3MYI and 3OUV—but not 'PEK! Also heard were ZB1BY, 5N2JKO and W2KQT. G3GGS says he hasn't got his "winter aerial" up yet (a centre-fed half-wave) but he heard ZB1BY twice, and gathered that FP8AS had worked G, GI and GW. G3RJH likewise remarks "aerial space limited, but hope to get up a half-wave across some kind neighbours' property."

GC2HFD/A worked from Alderney (August 10-28) and was joined for part of the time by GC3IFB/A. A 375ft. wire was used for Top Band, but the general comment was "low activity and high static level." Quite a few SSB contacts were made, however, one of the best being with GI6TK. On the whole (and on all bands) conditions were not quite so good as at Sark last summer.

from remote places." (GW3FSP) . . . "Please may we have an article on Top Band DX aeri— are they *all* loaded verticals?" (G3REA).

"I choose a station which radiates a T9 signal, has an operator with a good fist and who says something (although even RST, QTH and name can sound more attractive if sent well). I may never get my DXCC this way, but I do derive some pleasure . . ." (G3IDG).

"The G station called, VP8GQ replied. Silence from the G until an anonymous helper sent 'GA' . . . the G sent '339, pse repeat report' . . . it is repeated by the anonymous helper. Ends up 'pse QSL.' I think he should send half the card to the other G for 'services rendered' . . ." (G3REA).

"EI-Bugs are around everywhere, and comments are as they used to be—either it's good or it's . . . ! Some of the G3P - - and G3R - - stations can give lessons to much earlier calls in respect of signal quality and keying" (GW3FSP).

TOP BAND LADDER

(G3P-- and G3R-- stations only)

(Starting Date, July 1st, 1962)

Station	Counties	Countries
G3REA	92	16
G3RRU	91	16
G3PLQ	87	14
G3RBP	85	21
G3PVK	83	15
G3PWY	83	14
G3RJH	70	11
GW3PPF	67	12
G3PPE	64	12
G3RFT	64	8
GI3RCS	61	9
G3RHM	56	9
G3PRT	53	10
G3RQT	49	10
G3PMR	46	10
G3RJM	45	10
G3RJI	45	5
G3RDQ	42	8

(NOTE: This ladder will continue until the end of 1963, but no new contestants will now be accepted.)

Fair Comment

"I would not permit a contact to count for any purpose (certificate, or what have you) unless there was at least one amateur permanently based in that country. Otherwise, a contact, yes—but a 'new country,' no." (GM3IAA) . . . "Out of every three or four VK or ZL stations called on *Forty*, one has come back. But I must have put out more than a hundred CQ DX calls when the band has been open, with no reply from VK or ZL. Moral: when the band is busy, listen and call them. Only after checking the entire band call CQ DX, and then re-check the whole band in case something new had popped up." (G3PIT).

"At last my 80ft. pole is ready for getting up, and provided the weather holds out, should get it in the air next Saturday." (GI6TK) . . . "After a break of some years, the great increase in the number of countries and prefixes sounds like a bingo session. DX is easier to work now than formerly, mainly due to greater activity

DX News from Readers

From GW3AHN: Gus fired up from AC3PT on September 15, but said he was leaving next day for Nepal, returning to Sikkim later . . . YA1BW, of CW fame, came up on SSB on September 12. YA1AN also active, both modes . . . VP2GAC was due to operate from Carriacou, his call reported as VP2SV/V/G! . . . VE8RG will be on from British Virgin Islands and also, possibly, Anguilla and PJ . . . Angus, ex-5N2AMS, has been heard as both MP4TAX and MP4MAP . . . VKØVK may operate from Heard Is. for a few days in October or November . . . Kuria Muria trip due at end of October, prefix allocated being VS9H . . . VQ9HB will make trips to Rodriguez and Chagos in February or March.

From SWL R. R. Loe (Colchester): A station signing AC4IF was heard on 21080 kc CW, early September. He was on at 2200-2230 on two nights, RST 579 with QSB.

From G3NOF: Activity from Corsica (via F9RY) includes F9UC, F9FC and F2CB on CW;

F9UC also on phone . . . VP8HJ should be on SSB soon . . . K4UTE due on Anguilla, October 9.

From SWL Dave Gray (Easington): VE8RG may operate from Sint Maarten as PJ5MF, SSB, first week in October . . . VP7LG may work from Anguilla, FS7, PJ5M and Tortola, same period . . . CE3AG arranging a trip to CEØZA (Juan Fernandez), late October, SSB/CW . . . HS1X, now off the FCC banned list, working W's at 1430 (14295 kc) . . . KS6BA will look for DX on Thursdays, Fridays and Saturdays, keeping the rest of the week for his usual phone-patches to W6 and KH6 . . . KM6BI, 6CE and 6CX all heard on SSB (14310 kc) at 0700-0845 . . . HI8XAG very active on SSB, high end of 14 mc, around 2145.

Aerial Appendix

Everyone seems to be asking questions, or voicing opinions, about aeri— and there could hardly be a more important subject just now. For instance, how do some of the DL's put out those colossal Top-Band signals? Full-length verticals seem to be the answer there—not puny ones base- or centre-loaded, but the real thing.

Forty-metre specialists remark that the DX'ers with ground planes have good signals, but the really outstanding ones come from some W's with two-element beams on towers. Well, it must be the height that does it, for a two-element beam only gives a gain of 3 db., and if their signals are S9, they should still be S8 or better on a dipole.

Is a loaded vertical *really* so much better than a dipole on Eighty or Top Band? Well, who can say? Nobody that we know of has a real *dipole* on those bands, for the simple reason that you don't get true dipole characteristics until the height is more than a quarter-wave . . . and for a reasonably low angle you should have the thing a half-wave high. Anyone know of a Top-Band half-wave which is 200ft. high, or more? Even on Eighty, the number of dipoles more than 60ft. high must be very small. Therefore, much of the radiation is vertical, or at very high angles;

and, for DX, even a rather inferior loaded vertical might well put out more RF at the low angle where it's needed.

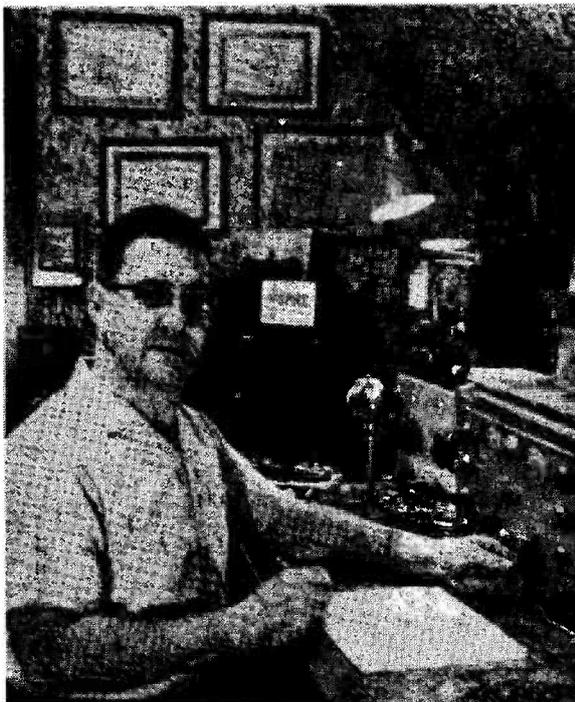
Many LF-band enthusiasts also suggest that the vertical is a snare and a delusion in one respect—it can be put up in a very small space, true, but what about the earthing arrangements? Unless you have exceptional ground conductivity, you *must* use radials, and where is the space advantage then? G6QB's next-door neighbour has a deep well in the garden . . . plans are afoot for trying a vertical counterpoise for the first time!

Late Flashes

G3RFH, who operated VP8HF/MM last winter, is sailing again in H.M.S. *Protector* on October 14. G3RFH/MM will take the air on 28 mc only; but from December 1st

he will become VP8HF/MM on 14 mc. The party will be carrying out a large-scale survey of some islands in the South Sandwich group, late February and early March; Ken Randall hopes to be ashore for three weeks as operator of the base station, which has a 40-watt transmitter with an upper frequency limit of 13 mc . . . too bad! But he will take along a 7-mc dipole in any case. Further gen. will be forthcoming, nearer the date.

Gus still going strong from AC3PT, September 19—589 at 1430 . . . Now rumoured that he will later operate from nine Trucial States (MP4T) . . . VK9DR (Christmas Island) now fixed up with the Hammarlund DX-pedition rig, manned by three operators until the end of October . . . BY1AD (Peiping) actually calls CQ Europe and works Europeans. ZD7BW has been on 7010 kc



W9PNE, of Lancaster, Illinois, is not only a keen but a very successful 160-metre DX man—he has worked 35 countries in five continents on Top Band, including VR3O. Licensed in 1931, W9PNE's father is W9KX, who is himself one of America's original amateurs, dating from the spark-gap days before even call signs were issued. The gear at W9PNE includes an NC-183 receiver and the Tx runs 50 watts on 160m. His aerial is a Marconi-type.

Photo by W1BB

CW, 2230 onwards . . . also reported on 3800 kc SSB (0300) . . . TU2AB, 2AQ and 9G1DX said to be planning trip to TZ8, XT2 and 5V4, next January; 9G1EO likewise rumoured in connection with XT2 and TY2 . . . VK4JQ (Willis) reported on 14040

kc CW and 14175 SSB, mostly week-ends 0600 onwards.

Sign-Off

That's the ration for this month, and plenty to get your teeth into. With conditions now changing seasonally (better DX but shorter

hours) the LF bands will be even busier next month. Reports, as usual, please, by the deadline of **first post on Monday, October 14.** Address them to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Good Hunting, 73 and—BCNU.

THE SMALL ADVERTISEMENT PAGES

This month's Readers' Small Advertisements—see pp.447-455—again make an extremely interesting spread. Among the offers-for-sale are a mast built from slotted-steel angle; a complete station for a prospective licensee, for only £13; a large sale-or-exchange offer involving test gear and Tx/Rx equipment—and a Top Band mobile rig for £100, which has a 1½-litre Jaguar (vintage 1947) thrown in! One of the "wants" is a 40-ft. crank-up tower, and there are some good offers of American equipment in the higher-priced category. You should be able to find almost anything you need in the regular reader advertising in *SHORT WAVE MAGAZINE*—which, of course, also means that a notice in this section is the best and quickest way of disposing of anything radio you may want to sell or exchange. Provided what you offer is not just junk, but usable equipment in reasonable condition at a fair price, you are assured of a deal. The cost (to private advertisers) is only 3d. a word, with a minimum charge of 5s. Draft your notice clearly and concisely and post it, with remittance, to: The Advertisement Manager, *Short Wave Magazine, Ltd.*, 55 Victoria Street, London, S.W.1.

TWENTY-FIVE YEARS AGO

The October, 1938, issue of *SHORT WAVE MAGAZINE* was produced during the first of the pre-war crisis periods, when war with Hitler's Germany seemed to be getting closer—the Editorial in that issue bears witness to this. However, the scare passed, temporarily at least, and in the text pages we find what even in these days would be regarded as quite a neat all-band CO-PA rig, using plug-in coils, and with variable aerial coupling; this was in the "Transmission for Beginners" series, too. Another article discussed the S-meter, and how it could be incorporated in an existing receiver. This issue also reported the death of Ross Hull, the famous Editor of *QST*, who was electrocuted in his own station on September 13, 1938. The "Other Man's Station" featured VS2AL, and the sixth in the Club History series was on the Bradford Short Wave Club. On the VHF side, in addition to A. J. Devon's report on some 5-metre tests from the summit of

Snowdon (when GW6AA/P worked 27 of 29 stations heard) a successful 56 mc Rx design was described. And there was a page of discussion on Band-Switching Receivers, with notes on what at that time was something quite new—a band-switched coil turret, produced by Bulgin's, still important manufacturers of radio components.

CORRECTION NOTE—"TWO-METRE CASCODE CONVERTER"

We much regret that in some copies of the September issue, a slight error—well, not so slight—appeared in the circuit diagram on p.347. There should be no short on the tapping point of L7. This was noticed almost in time, but many sheets had already been run before the error could be corrected. The diagram should show the xtal going to the coil, and the tap to R12, C15. And C2 should have been shown as a feed-through condenser.

CAN ANYBODY ELUCIDATE ?

Since the appearance of the last issue, somewhere in the mail a photograph came in of a group of six (intelligent looking) chaps—no covering letter, and no mark of any kind on the back of the print. Whose photograph is it, please, and could we have the usual details, as the picture is suitable for using in the *Magazine* ?

PROPOSED B.S.W.L. RE-UNION

At the suggestion of G3IDG (*QTHR*) it is proposed to have an informal re-union of such members of the old British Short Wave League who may happen to see this notice. The day chosen is Saturday, November 2, in the Exhibition Hall—it is the last day of the show—and it is simply asked that those who were League members at any time during 1935-1953 should wear their BSWL badges (if they can find them) and be on the look-out for others doing the same. Though we still receive enquiries about the BSWL, the League ceased operations as an organised body in March, 1953. Many of its members are, of course, still very active, either as SWL's or licensed amateurs. The sponsors of the proposed re-union are G3IDG, G3NOF, and SWL F. W. Parkhurst (BSWL-226).

Be sure to visit the Exhibition at the

Seymour Hall, London, October 30 — November 2

Miscellany

COMMENT ON CURRENT EVENTS

Back to the theme of static electricity, particularly lightning, for a quick, final word. G3JQQ writes "if a discharge occurred during aerial-earthing operations it would hardly matter whether the lead-in or the earth wire was being held by the unfortunate concerned. You should categorically state that it is most foolish for anyone to tamper *at all* with his aerial system under these conditions, *i.e.* a nearby storm."

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Intruders in our bands—G3RNX predicts that when Fifteen and Ten come back into their own, we shall find commercials and broadcasters parked all over the place. Right now, Fifteen is a "veritable testing-ground" for certain Middle-Eastern countries, and even Switzerland has jumped in with some point-to-point services. No, our bands will not be taken away from us—they will simply be encroached upon.

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Heard on the Air (1): "I thought the QSL craze was something one grew out of at the same time as one went into the first pair of long pants."

(G2--, on 80-metre SSB)

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W6BMM claims a unique record—he has been licensed for 15 years but has never yet operated from his licensed QTH! He has been an aeronautical mobile, a maritime mobile, and a portable from KL7 and many U.S. districts . . . and now his company is moving him again.

("QST," July)

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"On one frequency appears what might be called the 'Technical Advice Service.' A very learned discussion, though (it is irreverently whispered) many of the technicalities bandied about come from an open text-book on the operating desk, rather than from the grey matter poised above it."

("GM Magazine," July)

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Heard on the Air (2): First SSB station: "You're drifting badly." Second ditto: "No, I'm shifting my VFO to keep netted with you." Third voice in background: "Funny, they're moving in different directions—must be my receiver."

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"Piracy, like so many of the finer crafts, is rapidly becoming a dying art. No longer does the super-DX roll in from East Acton, Cheam and all points East, spurring on those certificate-hunters to splendid pile-ups and visions of first-time QSO's."

(G3FGN in "Mercury," Royal Signals A.R.S.)

The reader who asks "what is the difference between Chinese Morse and Baghdad Morse?" runs the risk of stirring up a hornet's nest. "Baghdad Morse" was a term applied to a particular style of sending peculiar to certain R.A.F. operators in the Middle East between the wars, and is hard to describe. Once heard, never forgotten. But the term "Chinese Morse" is, so far as we know, merely an opprobrious epithet for various kinds of really *bad* stuff. Incidentally, those innocents who imagine that an El-Bug must send perfect Morse might like to ponder on the faults that are possible on an ill-adjusted specimen: Dots too long; dots too short; dashes too long; dashes too short; mark-to-space ratio wrong; dot-to-dash ratio wrong. And to these the *operator* himself may add the common fault of spaces between letters and spaces between words being wrong. There's only one kind of perfect Morse, but an almost infinite variety of imperfect kinds. Yes, being on CW is a hard life.

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Strange phenomenon reported by several readers, and confirmed by the assembler of "Miscellany": On most afternoons a weakish SSB station appears on about 14030 kc, in among the CW types, and for a few minutes at a time, with pauses, appears to relay some kind of broadcast. The accent is American, the contents of the broadcast are political and anti-Communist, but it is not the Voice of America. In any case it only runs for short, disjointed periods. What is it?

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Confirmation that the GPO are most helpful when it comes to the issue of pre-war call-signs (*see* September issue, p.356) comes from G4JA. He was licensed in 1929 as G2JA, but allowed it to lapse in 1936. When, in 1958, he re-applied, he asked whether the old call was available. It wasn't, but he received a "most courteous letter" offering him the choice of G2JP or G4JA, and says it was a real pleasure to find the GPO so accommodating and understanding.

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Heard on the Air (3): "Yes, I have a beam, but it is only 25 feet above ground potential."

(W2--, on 14 mc SSB)

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W1BB, who is always achieving notable "firsts" on Top Band, recently added to his list a QSO with ZS2FM. He says that he could never have heard the latter's very weak 10-watt signal without the new Hammarlund Noise Blanker which he is now using. Its two parts silence noise in the IF and in the audio stages, and may be worked simultaneously or

separately. WIBB says "It makes a hole in the signal, but your ears don't work fast enough to notice the hole, and the crashes no longer overload the receiver."

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Intriguing title for a talk, by G3BCM to the Surrey Radio Contact Club: "Launching-pads for electronically-generated electro-magnetically propagated radiation." (Yes, he means aeri-als.)

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Break-in Operation is normally very desirable, but GM3EDZ would very much like to meet the operators who worked this mode on his premises a few weeks ago. Fortunately it was his business premises, so his gear is still intact. ("GM Magazine")

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A certain Midland DX'er, greatly worried by an enormous but unstable carrier in the 14 mc band, noticed an unfamiliar appendage on his aerial mast, and found a neat little transistor oscillator literally "nailed to the mast" by some local practical joker. Further south, a case came to light of elusive interference caused by a traffic bollard, of all things (but there was a transmitter inside it, wired to the mains!).

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August QST contains an interesting article on a 7 mc Mobile SSB Transceiver with 60 watts p.e.p. output. An inexpensive power supply for a big Linear Amplifier is also described, and the aerial specialists will be interested in W7QB's description of a "Trap Collinear"—a combination of the well-known trap technique with the advantages of an Extended Double Zepp.

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"Anyone found signalling by radio to a privately-owned ship may be arrested by a member of the

general public." These words, heard on the BBC Home Service at 8.25 a.m. on August 16, gave us quite a start. Danny Weil was the private owner of *Yasme III*, undoubtedly; and some recent goings-on around the Seychelles and the Aldabras were also most interesting.

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A beginner's outfit for the 80- and 40-metre bands, described in August CQ, has an unusual feature in that it is claimed to be TVI-proof. The average 6L6 crystal-oscillator novice rig seems to spit harmonics in all directions and involve the unfortunate beginner in trouble from the start. It should perhaps be mentioned that the Americans have no TV channels near 42 or 56 mc!

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The efficient loading of a quarter-wave "Marconi" aerial on 80 metres is another subject covered in August CQ. A screening-box, a suitably-designed coil with taps in the right places, tapping-switch and variable condenser from a TUSB tuning unit, and you can be in business with that semi-vertical 60-footer.

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The "gentleman's agreement" band plan for phone and CW is taking some hard knocks these days. On Eighty, it is the exception to find any CW above 3550 kc, and certainly the phone comes right down to that frequency. On Twenty, hardly a day passes without some phone operation encroaching on 14090 or even 14080 kc. Forty is a complete farce anyway, since no one seriously tries to use CW above about 7020 kc these days. It is ironic to note that on One-Sixty, where there has never been any sort of agreement, the brass-pounders voluntarily keep to the region from 1800 to about 1860 kc; and in general the reverse holds good except for Sunday mornings, when you will find phone anywhere on the band.

EIGHTY METRES WITH A TOP BAND TRANSMITTER

MODIFYING AN EXISTING RIG,
OR BUILDING FOR BOTH BANDS

F. G. RAYER, Assoc.Brit.I.R.E. (G30GR)

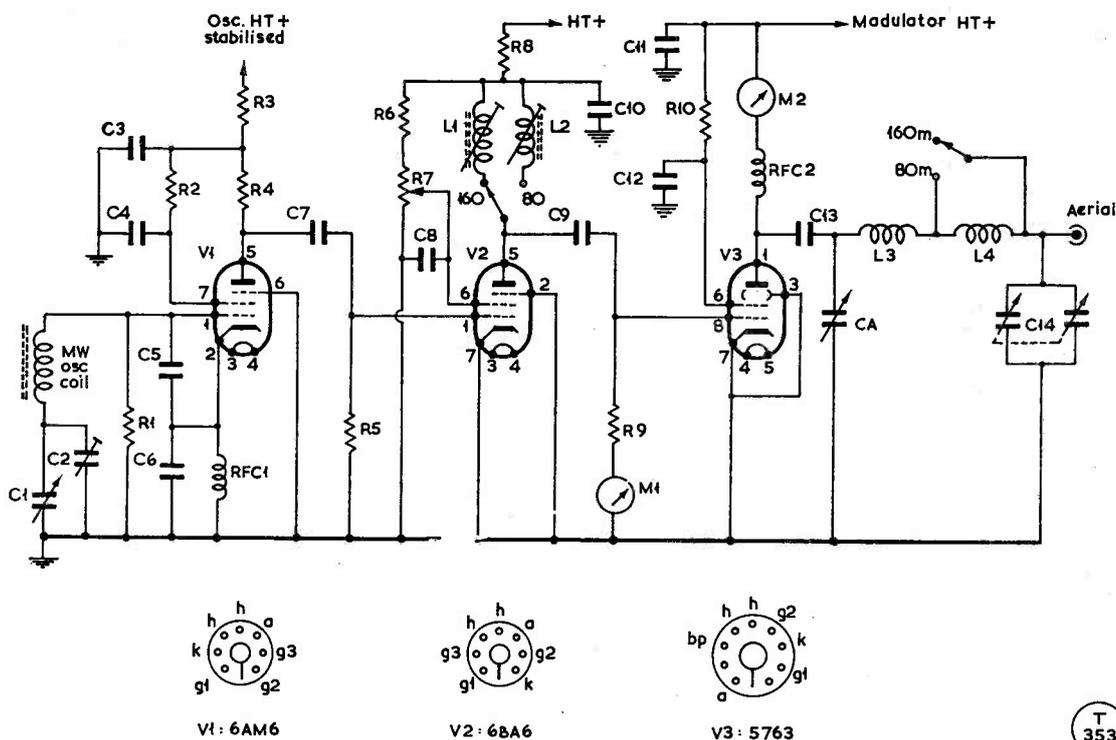
WHEN building a new Top Band transmitter, it was decided to modify the circuit for operation on the 80m. band in addition to 160m. This proved to be very simple, and completely successful. After modification, the transmitter has been used almost as much on 80 as on Top Band. Similar modification should be possible with almost any 160m. transmitter, giving coverage of 80 "free."

Up to 150w. is, of course, allowable on 80, and 10w. may appear a bit meagre. Despite this,

distances covered on 3.5 mc have in general exceeded those achieved on 160, and many contacts have been had on 80 when 160 was practically dead.

The diagram shows the circuit of a fairly representative 160m. transmitter, the modulator being omitted. There is naturally no reason why the transmitter should employ this particular circuit, as many equally good arrangements are available. Nor is there any need to employ the valve types shown (if this circuit is used to build a transmitter) since many similar valves are equally satisfactory.

The VFO covers 1.8-2mc and all stages work straight through on 160 metres. L1 is broadly resonant at about 1.9 mc. For 80m. the buffer is used as a doubler, L2 being tuned to 3.65 mc. A single pole 2-way switch is added, so that the original coil (or choke) L1 may be selected, or the new coil L2. Wiring here is short and direct, with the switch operated by an extension spindle. L2 was chosen to resonate with stray circuit capacity and had an adjustable core. A coil of fixed inductance, with 100 μ F parallel trimmer, gave similar results, though



Showing how a basic design for a Top Band transmitter can be modified to give output on 80 metres. V2 is made to double, with L1, L2 selected for the band in use, and a switched coil can be used for the PA tank. The text discusses the idea further and — since a Top Band transmitter could be built from this circuit — all values are given and the coil data for both bands are covered in the article.

more rapid falling-off of grid drive towards the edges of the band.

The grid current meter is included at M1, or a common meter may be switched for grid and anode readings. To obtain coverage from 3.5 mc to 3.8 mc, the VFO is tuned from 1.75 mc to 1.9 mc. In home-built equipment, no difficulty should arise in arranging for the VFO to cover from 1.75 mc to 2 mc. In commercially-made transmitters with VFO covering 1.8-2 mc only, the 3.6-3.8 mc part of Eighty will be tuned with the VFO showing half-frequency. A new scale can be drawn up, for whichever method is adopted.

L2 is adjusted at about the middle of the band, for maximum grid current—about 3 mA will do for the 5763 and many other valves. The grid current when doubling is slightly reduced, but should be sufficient if a little extra is available on 160m. Typically, if 3 mA is available on 160, around 2 mA should be obtained on 80m. R7 is the drive control.

PA Tank Arrangement

The only other modification is to arrange that the PA tank shall cover both bands. A separate 80m. coil was tried, selected with a 2-way switch, and also a tapping on the 160m. coil. As there was little difference in results, the tapping was employed, as in the circuit, as this could easily be contrived on the

Table of Values

The Two-Band Transmitter

C1 = 25 $\mu\mu\text{F}$, VFO tune	R3, R8 = 2,200 ohms
C2 = 75 $\mu\mu\text{F}$, VFO set	R4 = 27,000 ohms
C3, C4,	R5 = 100,000 ohms
C8, C10 = .01 μF	R7 = 50,000 ohms
C5, C6,	R9 = 22,000 ohms
C13 = .001 μF	R10 = 5,600 ohms, 2w.
C7, C9 = 100 $\mu\mu\text{F}$	RFC = 2.5 mH RF choke
C11, C12 = .002 μF	M1 = 0-5 mA
C14 = 2/500 $\mu\mu\text{F}$, BC	M2 = 0-50 mA
gang type	V1 = 6AM6
CA = 250 $\mu\mu\text{F}$	V2 = 6BA6
R1 = 68,000 ohms	V3 = 5763
R2, R6 = 33,000 ohms	

NOTE: All coil values are given in text, p.430

home-wound 160m. coil. Here, L3 gives 80m. operation, and the full coil (L3 and L4 in series) remains for 160m.

Some commercially-made 160m. tank coils do not lend themselves to easy tapping. If so, a completely separate 80m. coil could be fitted; a 2-way switch is then necessary at the anode end of the circuit. Spare switch contacts should be connected to short the unused winding.

No difficulty should arise in operating the modified transmitter. As all stages work at the same frequency on 160 metres, doubling for 80 metres helps maintain stability. A PA stage stable on Top Band is not very likely to introduce troubles on 80m. [over

If the PA receives 250v., 40 mA on M2 indicates 10w. input. When HT, PA and modulator permit, it may be possible to run a bit more power on 80 metres.

Aerial Considerations

End-fed aerials are commonly used on 160, and may remain unchanged on 80. If the aerial was near a $\frac{1}{4}$ -wave on 160, it will be around a $\frac{1}{2}$ -wave on 80, and thus at much higher input impedance. As a result, the aerial loading condenser C14 (0.001 μ F) will need to be at considerably reduced capacity on 80 than on 160. Aerial current, if measured, will also be much smaller. This does not indicate inefficiency on 80m. but is natural when measuring current at a high impedance.

Coils

The 160m. coils will already be present in a ready-made transmitter. If the transmitter is built from the circuit here, a medium-wave oscillator coil can be used for the VFO, or a MW aerial coil, with the unwanted windings removed. Alternatively, 95 turns of 34g. enamelled on a $\frac{1}{2}$ in. diameter cored former will give the coverage. The VFO should have about 100v. to 150v. HT, from a stabilised or well smoothed supply. HT for buffer and PA is about 250v. to 300v. A "net" switch, to apply HT to VFO and buffer only, allows for tuning up.

A miniature dust-cored MW coil was found suitable for L2, turns being removed until adjustment

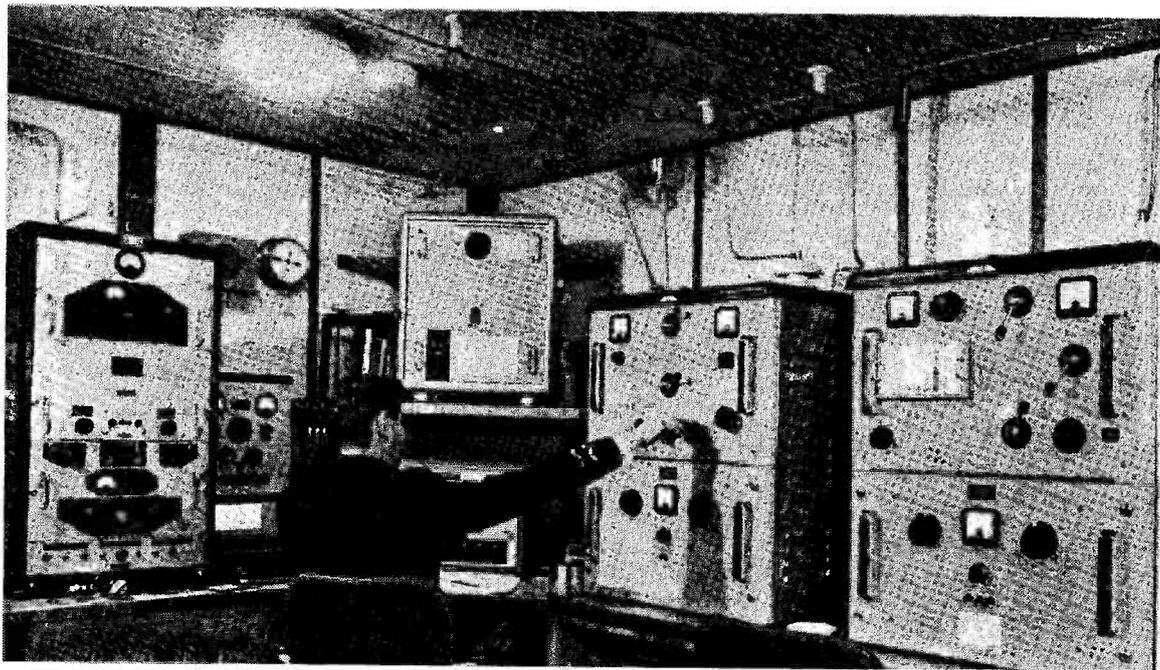
of the core gave a peak in grid current around 3.65 mc. Other small coils tunable to the band should do.

The PA coil was 60 turns of 26g. DCC on a $1\frac{1}{2}$ in. dia. ribbed former, tapped at about the centre for 80m. A single unswitched coil for 80 and 160 was also used, turns being adjusted until 80 was tuned with CA nearly open, and 160 with CA nearly closed, and this was found quite effective.

HAROLD MERRIMAN, G6GM

We very much regret to have to record the passing of Harold John Merriman, G6GM, of Holsworthy, Devon. He died peacefully in his sleep during the night of September 16/17, at the age of 79. Harold Merriman joined the Royal Navy as a boy-entrant and was trained in sail. He retired from the Navy soon after the Kaiser's War and, like so many sailor-men, took over a little Devon farm, where he worked hard and happily for nearly 40 years. The callsign and licence he inherited from his younger brother, George, when the latter emigrated to New Zealand in the early '30's. Later, G6GM became very well known on the LF bands, particularly 160m. and, though he never ran much power, he had a "green finger" for aerials and an exceptionally favourable DX location, of which he made full use. A fine character of the old school, he will be remembered with deep affection by all who knew him.

A.J.F.



The radio room of the new Mobil tanker "Mobil Enterprise" is fitted with a variety of interesting equipment, which includes not only transmitters and receivers for long-distance communication, but also navigational aids and VHF sets for port work and docking. The main transmitter runs 600 watts over a wide range of frequencies in the medium-wave and HF bands, and the VHF gear gives selection of the 28 channels used in the international allocation for marine operation. The whole installation as pictured here was supplied by the Telecommunications Division of Associated Electrical Industries, Ltd., who are also fitting other vessels of the Mobil tanker fleet.

VHF BANDS

A. J. DEVON

FEW who follow this piece will not be aware that there is a good deal to cover since our last appearance—what with a nice EDX/GDX opening, the contest activity, and some new, and very interesting, work on 23 centimetres. However, it is equally probable that what they do *not* know about is an excellent Aurora opening late in the evening of Sunday, September 22—indeed, it is certain that this passed almost unnoticed (except by the few who did stay up late) because there was, unfortunately, very little activity.

To get the happenings of the period into proper order: The contest week-end, September 7/8, produced some rather miserable weather, to say the least, but this did not appear to damp the ardour of the /P types, and the level of activity was as high as usual for this affair, which was the Region I I.A.R.U. event. Moreover, as all VHF bands could be used, there were several groups out portable to work all four bands from 4 metres to 23 centimetres. It is understood that from the Harrow club camp G3HBW worked G3KFD on 23 cm., for an astronomical aggregation of points. The G3FD/P group, working three bands 4m.-2m.-70 cm. from their old Dunstable location, knocked

up a total of 24,704 points; their two-metre break-down is 44 /P's, 55 fixed G's and 9 EU's. Scores in terms of total 2m. stations worked were in the region of the 200's. G3FRV/P near Bognor was on this figure by 1745 on the 8th. G3EFX/P had 107S worked at 1045 on the Sunday morning, and had got 144S by 1745, when G2HIF/P was at 145S; the latter group were also on the other VHF bands, and had about 25 contacts on 4 metres and one on 23 cm. with G3HBW.

G3GWL, who is now putting out such a potent signal from Bletchley, raised F3LP at 0940 on the Sunday, and F9NJ at 1630, when the latter had 156 stations worked on two metres. Some EU's were getting into the South Midlands district, and ON4NS/A was a good signal, raised by many of the /P's. As always, there was very little CW to be heard, and a good deal of frequency-hopping was noticed, some of the portables using three channels about the band. The 4-metre band gave very good results, and there were probably about 100 stations using it during the period of the contest—in fact, there were many more on 70 mc than on 70 cm. By the early afternoon of Sunday 8th, the Wx had cleared up considerably, and the portables were able to break camp under more or less comfortable conditions.

G3NOX/T-F8MX/A on 23 Cm.

This very fine QSO was achieved late in the evening of September 15, after contact had first been made on 70 cm. The path-length is 156 miles, and is the European record for the band—so congratulations to them both. It was phone both ways and, according to Jeremy, quite an easy QSO once they had found one another. The F8MX gear was described here last time. G3NOX/T has an ex-Army type 4ft. parabola, and runs 20w. to a 3CX100A in the PA; his converter is to the G6JP design.

Though we have not had positive confirmation, it is believed that G3LQR and G3LTF were also in on a 23 cm. contact with F8MX/A—however, they are both a little nearer than G3NOX/T.

Of course, all these 23 cm. happenings took place when conditions were at a peak during the September 13-17 opening. The right sort of weather development started on the 13th, the two-metre band was very good over the 14th-16th, being particularly so for the week-end 14th-15th, and then things faded down when the weather began to break on the 17th. Since then, there have been some good evenings, but patchy and nothing sustained.

Aurora, September 22

The fullest report about this interesting occurrence comes from GM3LDU (Clarkston). It gave a sustained opening of at least two hours, 2330-0130, during which GM3LDU worked three ON's, a PA, and two SM's, with three OZ's heard—this was in addition to the few EI/G stations that happened to be on. The most striking experience for GM3LDU was the way the beacon signals, GB3CTC and GB3VHF, built up in strength, the latter being a good S9 at 0030, and GB3CTC stayed in till 0100.

During this session, GM3LDU

TWO METRES COUNTIES WORKED SINCE SEPTEMBER 1, 1963 Starting Figure, 14 From Home QTH only

Worked	Station
45	G3GWL
42	G3LRP
40	G3HRH
38	G3BA
29	G3CO
20	G5JU
19	G2BDX, G3KPT
18	G3CKQ
16	G3HWR
14	G3CCA, G3OZF, G5ZT

This annual Counties Worked Table will run till August 31, 1964. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving call sign and date for the county worked. To keep the Table up-to-date, claims should be made at intervals of not more than two months.

worked 8 countries, so went to bed not dissatisfied. But he points out that from the strength and steadiness of the beacons, all the U.K. should have been workable—only two G's were heard! EI2A and EI4R were on, and the latter was worked. Of course, as all times given here are GMT, most people would have been tucked up for the night—unless, like GM3LDU, they had got a sniff of the first slight *Ar* signs at 2100 or, like GW2HIY, noticed it on TV even earlier.

We have not had much DX work by Aurora this season—and

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
40	G2XV
36	G3JMA
35	G2CIW, G3KPT, G6NF
33	G3JHM/A, G3LTF
32	GW3ATM
31	G3JWQ, G5YV
30	G3KEQ, G3LHA
29	G3LQR
28	G3HAZ, G3HBW, G3NNG
26	GW2ADZ
23	G3BKQ, G6NB
21	G3AYC, G3IOO
18	G5UM
17	G3BA, G3BNL, G3MPS, G5QA
16	G2DDD, G3BYY, G3MED
15	G2OI, G4RO
14	G2HDZ, G3FAN
13	EI2W, G2BDX, G6XA
12	G3HWR, G3NJO/T, G5BD
11	G3HRH
10	G3IRW, G3LZN, G5DS
7	G2HDY, G3JHM, G3OBD/P
6	G3FIJ, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G3LTN, G5ML
4	G3EKP, G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue.

this is not because there have been no auroral manifestations. In fact, *Ar* conditions develop quite frequently, usually around midnight, but have to be watched for. The first signs are always on the TV channels. If two-metre signals are then monitored, and the carriers (or CW notes) of the more distant ones found to be going fuzzy and becoming rough, with speech more or less unintelligible, then is the time to turn the beam to the North and start listening for DX. The auroral curtain will easily reflect signals, at great strength, from as far away as southern Europe—indeed, HB has been worked several times by Aurora—and though Sideband phone can be copied, it is better to stick to CW. The roughness of the signals is due to the strong multiple-path reflection, and is the reason why AM phone is virtually impossible to read.

Getting back to the September tropospheric opening: Conditions appeared to swing east-west on the 16th, having been better north-south during the two previous evenings. A number of new call-signs were heard from East Anglia—notably G3RK (Bungay, Suffolk), G2FLR (Ipswich), G3HPR (Gorleston, Norfolk), and G3JMU (Lowestoft). This was on two metres. On 70 centimetres, G3LQR worked a DL1, and it seems the nearer EU's on that band were very strong in East Anglia.

The Tabular Matter

As we are now entering on the new VHF season, most of the tables are in this time—and your A.J.D. would just mention that in all, no less than 80 movements have been recorded (correctly, it is hoped!). This alone is a good indication of how things have been, in terms both of activity and conditions, though a proportion of the claims do represent a carry-over from last month, when the All-Time was shown.

Tom Douglas, G3BA, of Sutton Coldfield, has achieved a notable "first" for last season's Annual (see p.435)—he worked the greatest number of counties ever recorded in a twelvemonth, and he sits at the top of the longest Annual-

Counties table we have ever published. This time, it is those who have worked 60C or more who have done exceptionally well—in other years, 60C has been enough to gain the top place in the Annual. So that proves how activity and conditions have been, too. Another notable performer, to get into second place, is EI2A who, like EI2W, has a geographical disadvantage.

In the 70 Cm. Annual (p.434), the leader is Jack Moseley, G2CIW, of Birmingham, who has been working hard on the band for the year, and is also getting going on 23 centimetres.

The new season's Annual has got away to a good start, and we hope to see many more two-metre operators coming in, particularly those who have not been long on the band. This annual-table business is not a contest, and is only the mildest form of competition, intended to make operating activity a little more interesting, and to encourage the working of stations in the GDX category. Every station on the two-metre band is DX to somebody, and it is a reasonable certainty that unless we had started these annual competitions as soon as two metres opened, progress would have been a great deal slower, with far less activity.

By the same token, we would be glad to open annuals for other VHF bands if sufficient entries can be made—it is hardly worth showing a table if there are not going to be more than about six people in it. This is why 4m. is being kept on all-time basis for the present—but from the look of that table now, it should be possible to start an annual before long. And as soon as some 70 cm. annual-counties claims come in, that table will be re-opened.

As regards the two-metre All-Time, claims are entered as they are received, and it will appear again when the space can be contrived.

Four-Metre Notes

G3FDW (Nr. Millom, Cumbs.) has a nice list of 16C worked on 70 mc—it includes four countries, and three of his counties are GM.

He suggests that more people should get out that "little-used VHF accessory, the Morse key." Weak, under-modulated carriers are heard often enough, from stations evidently just nattering with locals—well, this is a phenomenon that has been with us since the early days of VHF, and is probably even more marked on two metres! Anyway, when G3JYP shortly comes on 4m. to give Westmorland, contacts with him will probably have to be mainly on CW, because of QRM from a local navigational-aid station.

G3OHH (Macclesfield) and G5JU (Birmingham) are both at 31C. G3LZN (Warwick) reports a very strong 4m. signal from EI2W, on September 15.

The Manchester chaps are making good progress, as the 4m. table indicates. GW3JHM/P in Radnor and Montgomery was a much sought-after contact, and G3PMJ has also worked GI3HXV; G2OI is at 27C, G3AYT has 17C, and G3PJK is well up with 32C.

G3HWR (London, N.W.3) can work three VHF bands, and on 4m. had a good QSO with G3PYE/P during the contest; he has got 5C for the new season.

EI2W (Co. Dublin) is another versatile VHF man, in that he also works three bands; he has been making regular appearances on 4m. and mentions September 15 as a day of very good conditions, on 70 mc as well as the other bands; Harry is up to 34C in the 4-metre table. Just starting on the band is G3CO (Dartford), who has what he describes as "modified commercial gear," with about 25w. in the PA. He and some of the locals have a sort of private "hot line" net on the 70 mc band, all using the same gear with identical crystals—nice idea for a talking channel.

Louis, G3EHY of Banwell, Som. has been preaching the 4m. gospel to the Devon/Cornwall chaps, and was glad to work G5ZT and G3LGM/P for Devon. During the contest on September 7/8, G3EHY found the 70 mc band very busy; he worked 30 stations for 23 counties in 4½ hours' operating, the best being G3FDW/P for Cumberland and

G2YU/P for Norfolk—yes, on four metres. All of which is one reason why G3EHY keeps ahead in the 4m. all-time. The G3FDW/P group had 25 contacts on 70 mc during the contest, after rather a bad start. G3FDW, on 70:279 mc, would like skeds (77 Meadowfield, Gosforth, West Cumberland). G5ZT and G3LMG are on 70:2 mc, and also offer skeds (QTHR).

News of Two

G3JYP (Appleby, Westmorland) says he failed to work his own county for last season's annual! He was one of the operators on G3BJD/P for the contest, and anent his home station, says he has a worrying aerial problem—it looks as if the feeder line to the slot has been o/c ever since it was put up; he cannot even get a return with the mains connected to the feeder!

G3CO (Dartford) remarks that as far as new countries are concerned, the only real possibilities left for him are OK and SP, as he doesn't expect to work anything very EDX except by tropo. Like several others, G3CO comments on G3ILD's splendid SSB signal from up in Darlington—and G3OCB (using the two-metre Side-band gear described in this issue) has come in for the same sort of mention for his from Truro.

G2BDX (London, N.12) makes a good start in the new Annual, and G3BLP (Woldingham, Sy.) remarks that after having missed HB1IV nearly 14 years ago, he was glad to make it with HB1ADT—but it seems a long time to have had to wait! Johnny, who has now worked 1,180 different stations on two metres, had a number of very good contacts during the openings, and says that GM3EGW is a regular QSO on these occasions. He got the GB2GC boys on Sark and Alderney, but GM3IUB/P was a dead loss, mainly because they were using too much phone and not enough CW.

G3BA has been running regular skeds with GM2FHH (Aberdeen) and G3IOE (Newcastle). This was during July-August, and the results were about 70% QSO-made on CW in the case of GM2FHH, with signals varying from S1 to S6; on

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

- | | |
|----|--|
| 22 | G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UR) |
| 21 | G3HBW (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP) |
| 20 | G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OK, ON, OZ, PA, SM, SP) |
| 19 | G3CCH |
| 18 | G6NB, ON4BZ |
| 17 | OK2WCG |
| 16 | G3BLP, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB |
| 15 | G2CIW, G2XV, G3AYC, G3CO, G3FZL, G4MW, GM3EGW |
| 14 | G2FJR, G2HDZ, G3BA, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KPT, G3WS, G5BD, G6LI, G8OU |
| 13 | G2HIF, G2HOP, G3DKF, G3DMU, G3DVK, G3EHY, G3GPT, G3HRH, G3JIT, G3NNG, G3PBV, G5DS, G6XX, G8VZ |
| 12 | EI2A, EI2W, F8MX, G3AOS, G3GFD, G3GHI, G3GWL, G3JAM, G3JKN, G3NUE, G3OBD, G3VW, G4LU, G5CP, G5JU, G5ML, G8DR, GW2HIY |
| 11 | G2AJ, G2BJY, G2CZS, G3ABA, G3BDQ, G3BNC, G3BOC, G3GSO, G3IUD, G3JYP, G3JZN, G3KUH, G3LAS, G3LHA, G3OHD, G4RO, G4SA, G5UD, G6XA, OK1VR |
| 10 | G2AHP, G2AXI, G2FPF, G3BK, G3DLU, G3GSE, G3JHM/A, G3KQF, G3LAR, G3LTN, G3MED, G3OSA, G3OXD/A, G3RMB, G5MR, G5TN, G8IC, GC2FZC, GW3ATM, GW3MFY, GW5MQ |
| 9 | G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BY, G3FLJ, G3FUR, G3JLA, G4LX, G5UM, G8GP, GC3EBK, GI3ONF, GM3DIQ |
| 8 | G2DDD, G2XC, G3AEP, G3AGS, G3CCA, G3EXX, G3GBO, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3OJY, G3PSL, G3VM, G5BM, G5BY, G8SB |

one or two occasions SSB both ways was possible, and these are thought to be the first such contacts G/GM. The sked times were 0800 and 2300 daily, so it is a very good record for a long and difficult path. As regards G3IOE, this was found to be an easy regular contact. Tom reports that the GM3IUB/P boys got a bad break with Wx and conditions, but were workable from the Midlands at all locations; G3BA also gives five other GM's heard or worked, and the following from Eire in addition to the regulars EI2A and EI2W: EI2AG (Co. Louth), EI4BC (Co. Wicklow), EI4Q (Co. Dublin) and EI6D (Co. Kildare)

—this is the sort of nice work a lot of people would like to get.

G3OSE (Hereford) is making progress, with more RF going into the beam—which is now fixed on the SSE heading because the top bearing at 40ft. has jammed. Quite a number of /P's were heard during the contest period, and a few contacts were made on CW. The GB3CTC beacon signal is consistent and useful, but G3OSE's complaint is that not enough attention is given to CW—yet sked contacts are made quite easily.

From Wakefield, Yorks., G3LRP reports himself as fully active again—indeed, he has already got 42C for the new Annual. He worked the GM3IUB/P expedition at all locations. His Tx, running 80w., is as described in the June, 1956, SHORT WAVE MAGAZINE (and a very nice job that is, too). The Rx is CC with a 6DS4 front end, into an Eddystone 750 tuning 2.4 mc; due to the excellent band-spread and the accurate calibration of the 750 on this range, frequencies of any stations heard can be measured to better than 1 kc by the following method: The Holme Moss TV-sound 3rd

harmonic comes up at exactly 144.75 mc; the 50 kc marker on the Class-D wavemeter is set at zero-beat with this signal; as the Class-D calibration is linear, it is only necessary to beat it to zero with any signal heard on two metres, and the frequency can be read off accurately. If the main Rx set-up is such that the xtal gives exactly 2.0-4.0 mc on the 750, its dial readings can be converted to two-metre frequencies. That the method works is proved by the fact that G3LRP has been able to find the GB3CTC signal and MS pings from Dresden TV, merely by setting the Rx on these known frequencies and waiting for something to happen. G3LRP explains that the idea is due to G5PW (Leeds)—it could be worked in the same way by anyone getting a reliable signal from GB3VHF.

Having got his slot-fed 8/8 up to 26ft. (it collapsed from 30ft.!), G3PKT (Rainham, Essex) put in an operating spell during the contest, to work 37 stations in 17 counties, and 16 EU's. He is now able to get out west and south-west, after a long period of frustration when only Londoners could be heard in those directions. His Rx is a cascode converter with a tunable oscillator in a box maintained at 70°C. by thermostat control; this osc. holds steady enough for SSB. G3PKT says his next project is a rubber-crystal, i.e. a VFO/VXO.

In sending some excellent photographs of his station—which we shall hope to show in due course—G3JXN (London, N.W.8) describes his journeyings as GW3JXN/P in Cardigan and Carmarthen, conditions not being up to much for most of the time; however, he got a good bag of QSO's. Gear used is the /M rig, running 20w. in the PA, with an E88CC converter and a 4-ele flat-top which can be pushed up to 18ft. The PSU is transistorised and, running off the car battery only, gives about four hours' operating, the charging being by the car generator under normal running conditions. G3JXN met GW2HQ at Aberdovey—the latter is ex-G2HQ, formerly of Sheffield and now retired. As both are medicos they had a pleasant afternoon together and

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
40	G3EHY
34	EI2W
32	G3PJK
31	G3OHH, G5JU
27	G2OI
26	G3JHM/A, G5FK
23	G3NUE
21	G3PMJ
20	G3LZN
19	G3BNL
17	G3AYT
16	G3BJR, G3FDW, G3IUD, G3OWA
14	G3OKJ
12	G3LQR, G5DS, G1BHXV
11	G3HWR
8	G3PRQ

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

70 CENTIMETRES

ANNUAL COUNTIES WORKED SINCE SEPTEMBER, 1962

Starting Figure 4

From Home QTH Only

Worked	Station
35	G2CIW
29	G3KPT
25	G3LQR
22	G3LHA
20	G3AYC, G3EDD
19	G3BNL
15	G5QA
12	G3OXD/A
9	G3HWR, G3NOH, G5UM
6	G3BIK
4	G3EKP

This annual Counties Worked Table has been reckoned from September 1st, 1962 and closed on August 31st, 1963. These are final placings for the year. The new Table for 1963-'64 opened on September 1st.

G3JXN says that GW2HQ is getting going on two metres, from a very fine cliff-side QTH—so we shall have a regular for Merioneth.

G2BHN (Yeovil) ended up with 40C for last season's annual, and G3CKQ (Leicester) is at 18C for the new one. GW3BCY (Swansea) worked GB2GC on Sark for his 18th county last time, and G5JU (Birmingham) having pushed his 4/4 higher than ever before, finds he is getting out much better.

For those who might like to know, the active Cumberland stations are: G3BW, 145.86 mc; G3BJD, 145.92; and G3RHE, 145.84. They all have good beams, are on most evenings looking south, and would be glad to have regular skeds with GDX.

G3BNC writes in from Southsea after a long absence from VHF;

**TWO METRES
ANNUAL COUNTIES**

Final Placings
1962-'63

Worked	Station
81	G3BA
70	EI2A
64	EI2W
62	G3BOC, G3EDD
61	G3BNL
53	G3JYP
52	G2BJY, G3JXN
51	G3CO, G3HRH, G3OXD/A
49	G3PBV, G3PTM, G4LU
44	G3PLS
42	G3GWL
40	G2BHN, G3PSL
38	G3NUE
37	G2AXI
36	G3CCA, G3LAS
35	G3FIJ
34	G3OJY
33	G3ILD, G3JWQ
32	G3DVQ
30	G3CKQ, G5QA
29	G2DHV/P
28	G8VN
27	G3SAR
26	G3BJR, G3NOH, G5UM
25	G3GSO
24	G2CDX, G3PKT
22	G3LQR, G3PTO
21	G3GVV
20	G3JHM/A, G3NPF
19	G3HWR
18	G3ONF, GW3CBY
14	G3IOE, GW3ATM

This annual Counties Worked Table closed on August 31st, 1963. Above are the final placings for the year. The new Table for 1963-'64 opened w.e.f. September 1st, 1963.

he is still running the old G2IQ-type converter with neutralised 6J6—it works as well as ever, and signals generally seem stronger than in the early days of two metres. They probably are, because there are more people with good

beams running higher power.

G5ZT (Plymouth) gave himself a good time out /P near Okehampton during the September contest, when he worked 129S for about 40,000 points, with GM3IUB/P included in the list—though this result was not as good as last year, when 174 stations were worked on two metres. He was with G3LMG/P, running a 4m. station from the same site. Since 1st September G5ZT has booked in 14C for the new Annual, and has heard many near EU's, mainly working locals and the nearer G's.

Having concentrated on operating since the beginning of September, at G3HRH (Welwyn, Herts.), what Ray describes as "a sustained effort" has produced the goodly total of 40C already for the new Annual, with 8C and two countries on 70 cm. GM3IUB/P were raised in Kirkcudbright and Wigtown, and on September 14 several far-westerly stations were worked, down to G3IGV in St. Austell. On the 15th some good 70 cm. QSO's also resulted, including F8MX/A and F9NJ. G3HRH has excellent equipment. The Tx runs 150w. to a pair of QY3-125's, modulated by 811's in Class-B; his beam is a man-sized affair consisting of two slot-fed 8/8's stacked vertically at a mean height of 35ft.; and the Rx is 6CW4-6BQ7A into a 680X tuning 10-12 mc. The 430 mc Tx takes 35w. in a QV03-20A PA, driven by a similar tripler, the beam is a single 8/8 slot, and the Rx a xtal mixer with A.2521 RF stage, using a BC-348 as main receiver. He thus has entirely separate outfits for both bands.

G8VN (Leicester) reports for the tables, and G3CCA (Oadby, Leics.) likewise; the latter had to contend with "a series of events" following a leak in the shack; and G3CCA has been getting a good signal from G3XC (Cornwall) for a nice piece of GDX. G3SJO (Colchester) got his ticket on September 6, and straightway plunged into the contest activity as G3SJO/P, with G3RHU and G3RTF to hold his hand; running 15w. to a 6/6, they had a good time and knocked off 68 stations, for what G3SJO says "was a good start-off on the air."

Another newcomer to VHF is G3OZF (Woodthorpe, Notts.) who

says he has rather a poor location, except to the south-west; he gets a better signal from GB3CTC than from GB3VHF. The set-up at G3OZF consists of a 6CW4-12AT7 converter into an 888A tuning 28-30 mc; the Tx has a QV03-20A in the PA, taking 40w., modulated by 6L6's; and the present aerial is a 5-ele flat-top at 40ft., with plans in hand for a motorised 6/6. Quite the right approach, and G3OZF should do very well in due course.

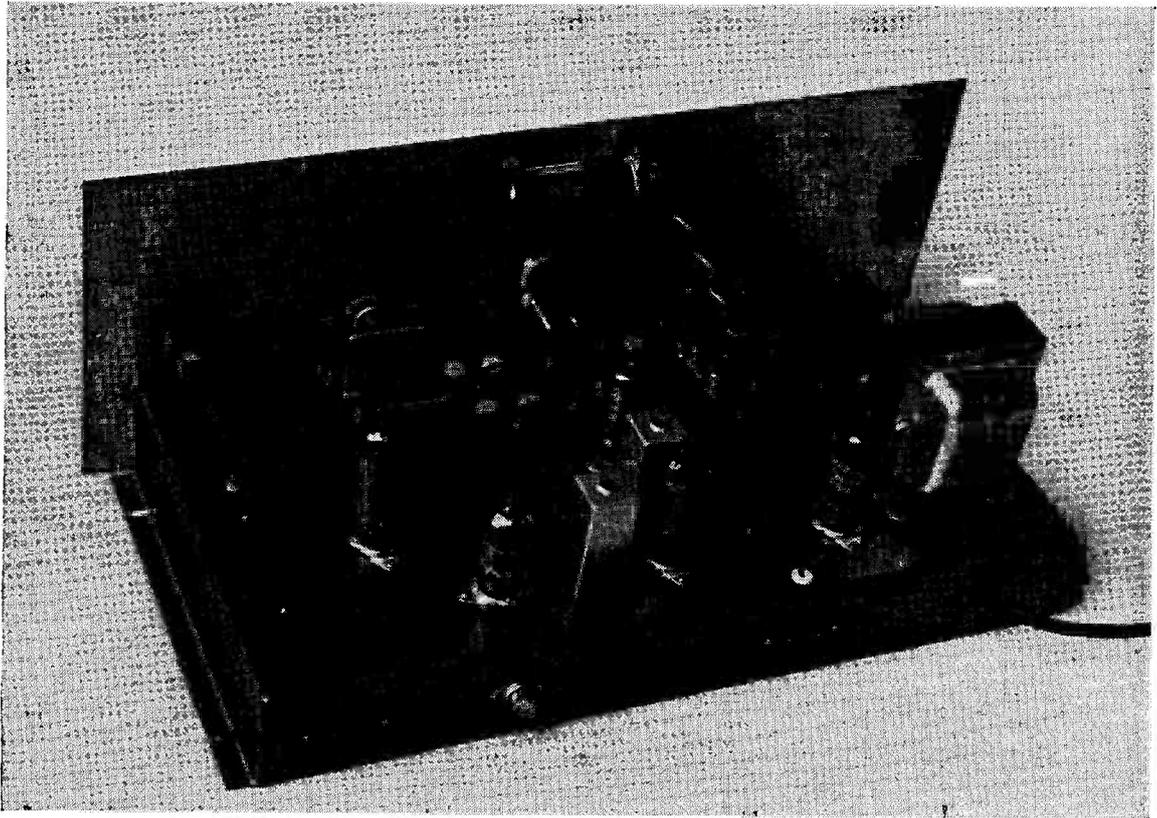
The GB2GC break-down of results shows that nearly 60 stations were worked from Sark, under good conditions on August 9, but the 10th-11th produced nothing from the mainland. From Alderney during August 13-15, about 80 contacts were made, with G3JXN as the first 2m. QSO for that Island. From Jersey over August 18-19, the only station worked was GC2FZC, who confirmed that conditions were very poor—however, it has been suggested that while in Jersey the GB2GC boys *may* not have been connected to their aerial, albeit unknowingly. There were plenty of South Coast stations on the look-out for them; previous experience has shown that cross-Channel contact with Jersey is possible under almost any conditions, and GB2GC was very well located 450ft. a.s.l. So . . .

G3RZG (Weymouth) has got going with the Tx described in the March, 1963, SHORT WAVE MAGAZINE—he says he is getting very satisfying results using a slot-fed 4/4.

There is just time and space to mention an event called the SP9 VHF Contest, to take place on two metres during October 13-14, 1800-2359 each day. From London, the heading for SP is about 085°, so if we get a break, there will be opportunities.

And to Conclude

Deadline for our next appearance is **October 18 latest**, and all being well the November issue will be on sale from our Stand 19 at the Exhibition on Friday, November 1st—do come and see us. Address all your VHF gen. to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. 73 de A.J.D.



Inside the Codar CR-66, completed according to instructions. It will be evident from this view that the receiver is very easy to put together, and the chassis and panel are supplied with all holes ready punched. The instruction manual includes a set of layout drawings, showing the assembly step by step.

THE CODAR CR-66/PR-30 ASSEMBLY

GENERAL-COVERAGE RECEIVER WITH TUNABLE PRE-SELECTOR

FOR some time now, we have been interested in the Codar CR-66 four-band general coverage short wave receiver, which comes at the extremely low price of less than £20 for the kit complete, for home construction from a 17-page manual telling you exactly how to do it. The parts and hardware supplied are of excellent quality, the slow-motion drives and dial assemblies being particularly good.

The circuit shows the design to be based on a simple mixer-oscillator, IF, detector/AVC and output arrangement, with incorporated power supply, involving five valves in all, or six with the tuning indicator as an optional extra. Band-spread is pro-

vided by a 17 μF twin-gang condenser in parallel with the main 325 μF tuner, and the coil-condenser values are such that tuning on the band-spreader is easy through all amateur bands, 10-160m. The input circuit can be trimmed up by an independent panel control, and BFO action is obtained by making the IF stage regenerative, this also controlling the inter-stage gain—see circuit pp.438-439.

To simplify construction, the coil pack and IF section are supplied factory-wired and aligned—and there is no question that this is a very important factor in the success of the CR-66, because if the assembly and wiring-up are carried out correctly and according to the instructions, there is virtually nothing that can go wrong.

At the top of the page is shown the layout above chassis, with the band-spread tuner to the left, and the aerial trimmer on the panel, above the coil pack, which is mounted across a cut-out in the chassis. This and all the holing is ready done on the chassis and panel as supplied. As can be seen from the chassis view, the layout is clean and straightforward with ample access — and space to

mount, say, a two-metre CC converter or a calibration oscillator to work with the receiver and off its power supply.

Our model as constructed and illustrated here—the front-panel layout is not shown in detail because it can be found in the Codar advertisement—proved to be sensitive and lively, with really delightful tuning controls, good front-end gain and more than enough audio output.

Hence, the CR-66 can be confidently recommended for the beginner-SWL who wants to build himself a good receiver, or for the amateur transmitter just starting on the air, who likewise requires a sound basic design to get him going.

It should be realised, however, that *because* this is a simplified design, too much should not be expected of it, and the CR-66 will not do everything. Its only real failing is the lack of adequate front-end discrimination (there being no tuned RF stage) and consequently second-channel interference can be very troublesome on some bands. Nowadays, of course, such QRM can hardly be tolerated in any receiver, and the problem is how to overcome it without undue complications.

RF Pre-Selection

Recognising this difficulty from the very beginning and wishing to avoid complicating the design, the Codar people offer a tuned RF pre-selector, the PR-30, as an optional ancillary, the point being that the PR-30 can be used ahead of *any* receiver capable of supplying it with necessary HT/LT. (A later version of this pre-selector is the PR-30X, which is self-powered, meaning that it only needs connecting in between the aerial and the main Rx input terminals, with a lead to an AC mains point.)

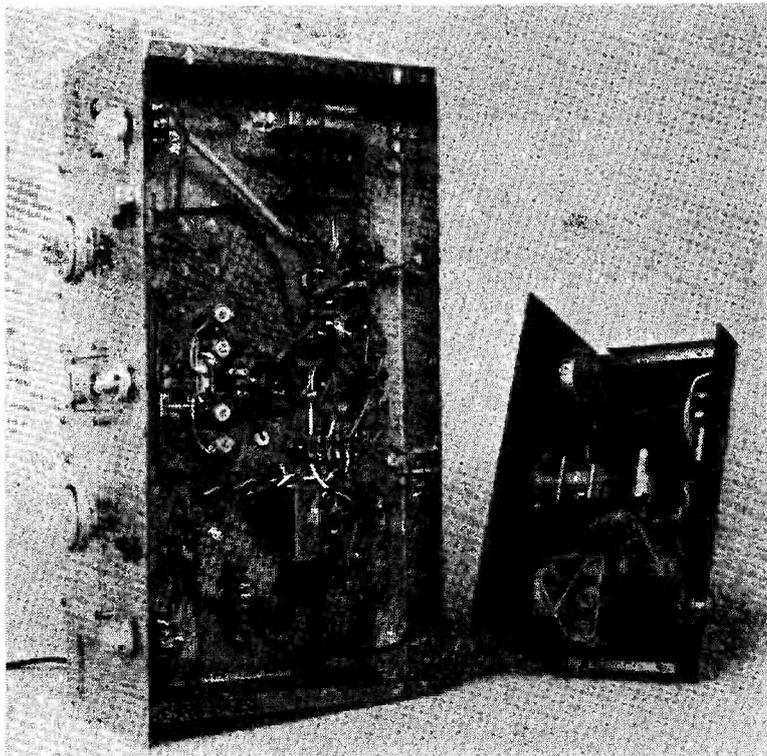
Used with the PR-30, the CR-66 becomes quite a different receiver, in that the second-channel trouble disappears and, with the extra front-end gain, it can be operated in a much “quieter” condition, which anyone accustomed to handling receivers on the short-wave bands so as to get signals out of them will understand.

As the PR-30 complete costs less than a fiver, our advice to anyone either possessing already a CR-66, or contemplating going in for one, would be to have the PR-30 as well—if not immediately, then later on. Since a tunable RF pre-selector is always a very useful accessory in any station—

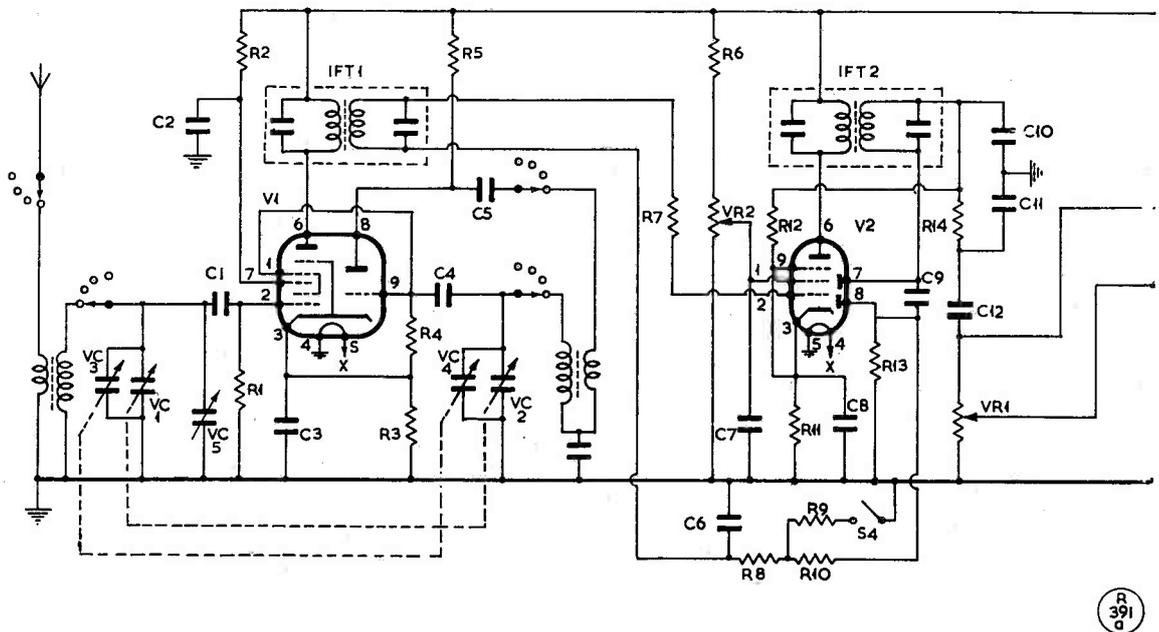
particularly where the existing main receiver is a hoary old HRO, an SX-24 or something of that vintage—it is as well that it be self-powered, to save having to take power from the main Rx or provide a separate HT/LT pack. This is where the PR-30X comes in; not only is it self-powered, but it has outlets giving extra HT/LT for the operation of accessory items, e.g. a VHF converter, which works very nicely with the CR-66, provided it is of the crystal-controlled variety. (The point here is that a CC/VHF converter requires no tuning control and hence no disturbance of the CR-66 panel is necessary.)

The photograph below of under-chassis layout and wiring of the CR-66 also illustrates the inside of the PR-30, this being one of the earlier models of the pre-selector. We understand from Codar's that in the current production the front panel is anodised which would greatly improve the appearance. A photograph on p.438 shows the hardware associated with the CR-66/PR-30, the central item in this view being the very smart speaker unit which goes with

[cont'd. p.439]



Showing under-chassis wiring of the CR-66 (left), as carried out from the assembly instructions. The coil-pack is the central unit nearest the front panel. Tag strips are extensively used as connection and anchoring points, and all iron-cored items (mains transformer, smoothing choke and output transformer) are near the rear chassis drop. On the right is an inside view of the associated Codar PR-30 Pre-selector, which covers the same frequency range as the main receiver and gives considerable gain, with much-improved discrimination.

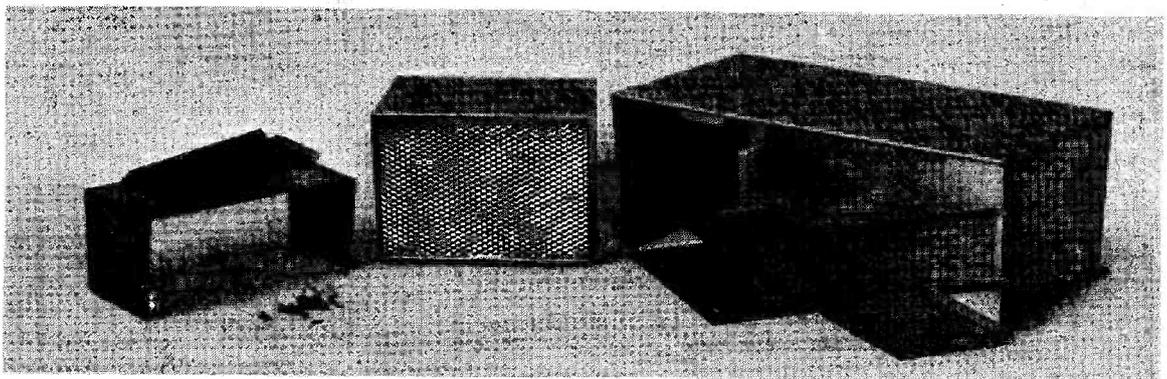


The Codar CR-66 is basically a simple superhet receiver, involving the minimum of valves and tuned circuits. It is put out as a kit, complete to the last detail (which includes nuts, bolts and wire) with an instructional manual explaining exactly how to build it up to the finished job shown in the photographs. The frequency coverage, in four switched bands, is 540 kc to 30 mc, with electrical bandwidth (VC3, VC4) giving good coverage of the amateur bands from 10 to 160 metres. The IF stage V2 is made regenerative, for gain control and BFO action, and neat switching enables the set to be used under amateur operating conditions. For best results, a receiver of this type (mixer-oscillator without a tuned RF stage) should be used either with an ATU as a "passive pre-selector," or in conjunction with the manufacturers' PR-30 Pre-selector, which amounts to a tuned RF stage giving considerable extra front-end gain and discrimination — see text.

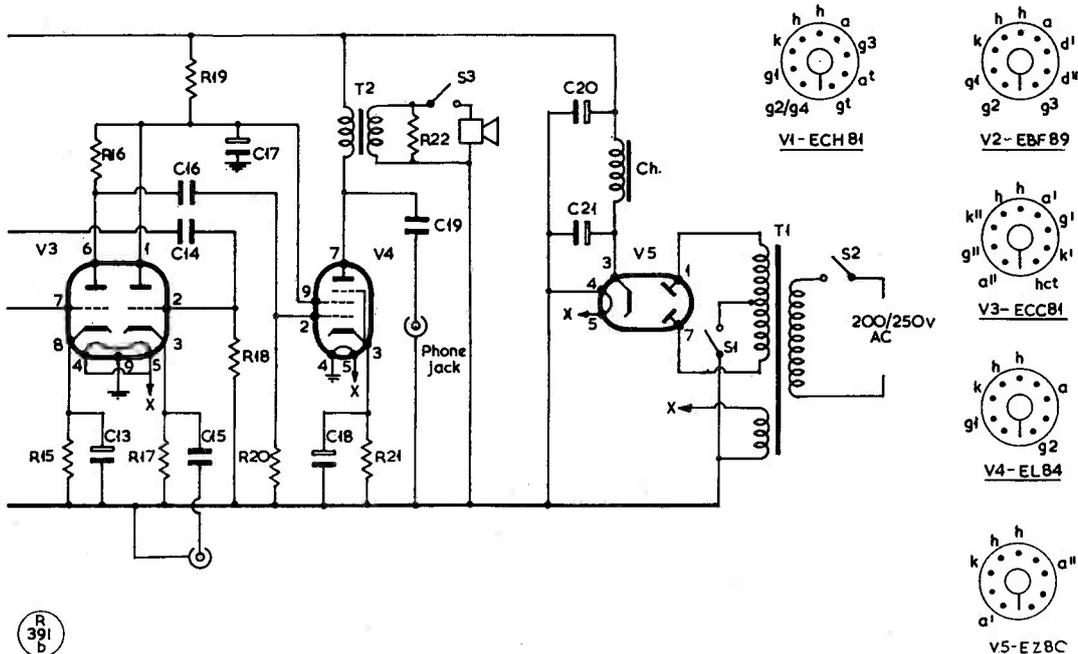
Table of Values

The Codar CR-66 Main Receiver Circuit

C1, C5 = 100 μ F	VC1,	R8 = 100,000 ohms	IFT2 = 470 kc (supplied)
C2, C3,	VC2 = 325 μ F, var.	R10, R12,	T1 = Mains xformer
C6, C7,	VC3,	R18, R20 = 470,000 ohms	(supplied)
C8, C19 = 0.1 μ F	VC4 = 17 μ F, var.	R14 = 56,000 ohms	T2 = Output xformer
C4 = 56 μ F	VC5 = 50 μ F, trimmer	R15 = 1,000 ohms	(supplied)
C9 = 22 μ F	R1, R13 = 1 megohm	R16 = 220,000 ohms	Ch = Smoothing choke
C10, C11 = 270 μ F	R2 = 39,000 ohms	R21 = 220 ohms	(supplied)
C12, C14,	R3, R11 = 150 ohms	R22 = 10 ohms	V1 = ECH81
C15, C16 = .01 μ F	R4, R6,	VR1,	V2 = EBF81
C13, C18 = 10 μ F, elect.	R9, R17 = 47,000 ohms	VR2 = 500,000-ohm	V3 = ECC81
C17 = 8 μ F	R5, R19 = 22,000 ohms	potentiometers	V4 = EL84
C20, C21 = 16/32 μ F	R7 = 4,700 ohms		V5 = EZ80



The metal-work, at left and right respectively, associated with the Codar PR-30 Pre-selector and the CR-66 receiver. At centre is the matching speaker, which is a complete unit and an optional extra. The three units together — Pre-selector, Receiver and Speaker — make an attractive and effective receiving assembly.



the receiver, as an optional extra; in fact, any reasonably sensitive 3-ohm speaker works well with the CR-66. It just happens that the PR-30 and CR-66 with the matching speaker make up a neat and good-

looking Rx assembly. And, as we know, many an SWL station is so equipped—and many experienced amateurs have found the PR-30 an excellent investment for receivers already in use.

PARTY PIECE

We are asked to say that Wayne Green, W2NSD, of *73 Magazine*, is bringing over a large party of W's (with xyl's), who are paying for a flying visit round the capitals of Europe. They will be in London over October 7/9, and for the evening of Tuesday, 8th, a get-together has been arranged, by the G3NMR's, at a place called "The Melodie Inn," near Gantshill Station, Ilford, on the Central Underground Line. If you would like to be in on this—the American charter-flight party totals no less than 75—get in touch right away with Mrs. G3NMR (QTHR) or ring *Crescent 0882*.

SCOUT JAMBOREE-ON-THE-AIR

This sixth annual event—which is by way of being an international QSO party organised by and for the Scout movement—will take place over the week-end October 19-20, midnight to midnight. The idea is simply that Scouts and Scout groups throughout the world should get in touch with one another via Amateur Radio. All bands 10-80m. will be used, and stations participating will call "CQ Jamboree." The international Hq. station is VE3WSB, Ottawa, with two transmitters on the air throughout the 48 hours, and covering all bands, depending on conditions and the QSO possibilities; modes used will be AM/SSB/CW, in the appropriate areas of the HF bands. A number of U.K. stations

are already lined up for the event, with GB3PBH operating from Baden Powell House, Queen's Gate, London, S.W.7. Others are GB3OLT (Solihull, Warks.) and GB3GBS (Great Yarmouth). There will be many more, as this year there has not been time for advance details to be notified, in most cases. Anyone with an interest in Scouting or the Scout movement may take part, and amateurs in all parts of the country are asked to invite local Scouts to their stations for demonstration QSO's. For further information and details of the event, get in touch right away with the U.K. organiser: L. R. Mitchell, G3BHK, Katoomba, Tyneham Close, Sandford, Wareham, Dorset. Last year 63 countries were represented in the Jamboree, with about 80 stations in the U.K. alone operated by Scouts or on behalf of Scout groups.

"MCC"—MAGAZINE CLUB CONTEST

Rules and general information covering the Eighteenth Magazine Top Band Club Contest appear in this issue — see pp.442-443. This is a fast-running event, and many clubs will have their plans laid, with dummy-runs organised to test equipment and operators, well before November 16/17. This contest is always very good training for the less-experienced operators in competitive working.

NEW QTH'S

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

GW3RXD, G. Llewelyn, Llwyn-On, Glan-y-mor Road, Goodwick, Pems.
GW3SCX, J. Naylor, 32 Graig-y-Tewgoed, Cwmavon, Port Talbot, Glam.
G3SDO, K. A. Heathfield, 33 Ward Road, Goldthorn Park, Wolverhampton, Staffs. (Tel.: *Wolverhampton 35590*).
G3SDQ, V. R. Brown, 36 Sophia Road, Leyton, London, E.10.
G3SEF, R. I. Frew, 9 Hollybank Place, Bloxwich, Walsall, Staffs.
G3SEM, P. J. Wright, 10 Avenue Road, Gorleston, Great Yarmouth, Norfolk.
G3SEY, R. Mackey, 98 Baycliff Road, West Derby, Liverpool, 12.
GM3SFH, A. J. Oliphant, 17 Rockwell Crescent, Thurso, Caithness.
G3SFQ, R. M. Mugford, 1 Davis Terrace, Tucker Street, Wells, Somerset.
G3SFS, W. G. Garton, 32 Maitland Road, Woodthorpe, Nottingham.
G3SFU, Miss P. Westoby, 26 Endike Lane, Beverley High Road, Hull, E. Yorkshire.
G3SFY, D. W. Shaw, 12 Longlands Road, Slaithwaite, Huddersfield, Yorkshire.
GM3SGG, S. H. Taylor, 23 Minerva Terrace, Greenock, Renfrewshire.
G3SGR, J. S. J. Craig, Cauldwell, Marle Green, Horam, Sussex.
G3SGV, E. J. Fallon, 8 Queens Road, Lipson, Plymouth, Devon.
G3SGW, W. J. Tully, 63 Glen Road, Liverpool, 13 (Tel.: *STO 8259*).
G3SGX, R. E. Bona, 44 Collindale Avenue, Erith, Kent.
G3SHA, R. M. Wilkinson, 112 Upton Drive, The Bache, Chester.
GM3SHB, W. R. Blanchard, 47 Caiesdykes Crescent, Kincorth, Aberdeen.
G3SHC, F. W. Wood, 9 Albury Avenue, Bexleyheath, Kent.

G3SHH, J. A. J. Gravina, 52 Birch Grove, Acton, London, W.3. (Tel.: *ACOrn 9114*).
G13SHI, S. H. McKaig, 52 Beverley Gardens, Bangor, Co. Down.
G3SHM, R. Hart, 2 Braddon Avenue, Urmston, Manchester, Lancs.
G3SHX, R. G. West, 115 Byron Avenue, Margate, Kent.
G3SIC, A. R. Hirst, 56 Whinfield Road, Claines, Worcester. (Tel.: *Worcester 21253*).
G3SII, E. J. McCormick, 45 High Acres, Abbots Langley, Watford, Herts.
G3SIL, E. A. Rudolph, 4 The Circle, Hale Drive, Mill Hill, London, N.W.7. (Tel.: *MILL Hill 1451*).
GM3SIM, S. J. Barron, 50 Stark Avenue, Duntocher, Clydebank, Dunbartonshire.
G3SIQ, A. J. Greenwood, 83 Ash Road, Cuddington, Northwich, Cheshire.
G3SIX, G. D. Edwards, 30 Norfolk Road, Maghull, Liverpool. (Tel.: *Maghull 1904*).
G3SJO, B. W. Garnham, 17 Sutton Park Avenue, Colchester, Essex.

CHANGE OF ADDRESS

G2CDB, R. A. Pittock, 33 York Avenue, Finchfield, Wolverhampton, Staffs.
G2PS, E. A. Parsons, 4 Sunnydown Road, Oliver's Battery, Winchester, Hants.
GM3FAX, F. D. Christie, 7 Finhaven Street, Tollcross, Glasgow, E.2.
GM3FRQ, J. D. Hendry, 22 Kerrsview Terrace, Dundee, Angus.
G3FVC, E. C. Palmer, 37 Headington Road, Maidenhead, Berkshire.
GM3IMR, Mae W. Christie, 7 Finhaven Street, Tollcross, Glasgow, E.2.
G3JJZ, D. J. S. Newton, 64 High Street, Green Street Green, Orpington, Kent.

G3JKE, K. V. Franklin A.M.Brit.I.R.E., 10 Weald Drive, Furnace Green, Crawley, Sussex.
G3KHE, G. E. Hayes, 13 Carlton Avenue, Wilmslow, Cheshire.
G3LDJ, K. Day, 482 Kilner Bank, Bradley Mills, Huddersfield, Yorkshire.
G3LTN, R. Marriott, 100 The Crescent, Andover, Hants.
G3MBK, D. W. Underdown, 20 Highfields Close, Farnborough, Hants.
G3NCJ, O. P. Bradley, The Cottage, Stonely, Huntingdon. (Tel.: *Kimbolton 206*).
G3NJA, Torbay Amateur Radio Society, Headquarters, Bath Lane, Torquay, Devon.
G3OAH, P. R. Whittlestone, 4 Aberdeen Road, Redland, Bristol, 6.
G3OHV, R. J. Taylor, 4 Somerset Road, Tunbridge Wells, Kent.
G3OLN, K. H. Walden, 250 Gloucester Road, Cheltenham, Glos.
G3RHL, B. W. Rous, Bar-Bri, Plot 11, South Court Estate, Wingham, Canterbury, Kent.
G3RQT, A. P. Carpenter, 59 Waldegrave, Basildon, Essex.
G3RRE, W. E. Brain, Stallington, Green Lane, Radnage, High Wycombe, Bucks. (Tel.: *RADnage 3105*).
G3RXF, W. J. C. Storeton-West, 45 Somerleyton Road, Oulton, Lowestoft, Suffolk. (Tel.: *Lowestoft 3606*).
G5IC, L. F. Ivin, Oakville, Longden Common, Longden, Shrewsbury, Shropshire.
G5ZK, R. N. Lawson, 1 Haytor Park, Stoke Bishop, Bristol, 9.
G6AW, W. E. F. Jennings, O.B.E., 16 Landon Road, Herne Bay, Kent.
GW6PO, H. Hillgrove (*ex-G6PO*), 34 Heol Mabon, Rhiwbina, Cardiff, Glam. (Tel.: *Cardiff 67194*).
G8AP, Dr. E. Pawson, c/o Mrs. Tacey, Waldene, Scawby Brook, Brigg, Lincs.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for November Issue: October 11)

(Address all reports for this feature to "Club Secretary")

THE full details and rules for the Eighteenth "MCC" appear in this section, and regular contestants will see that the broad picture of the event is practically unaltered. We do, however, take note of remarks sent in each year with the logs, and have made two "minor mods." this time as a direct result of last year's comments.

Firstly, many Clubs suggested that, as the contest is now restricted to one week-end (for many years it covered two consecutive week-ends), more time would be appreciated. We have accordingly slipped in an extra hour for each session, giving a total operating time of eight hours.

Secondly, it was suggested, last year, that Devon/Cornwall were pretty hardly treated, since it was as difficult for them to work other Southern Zone stations (for only three points) as it was to get into almost any other part of the country except the extreme North. So they have been transferred to the Western Zone this year. This will give them five points, instead of three, for every contact with the Southern Zone. It will be interesting to see how they make out this time.

Thirdly, since the identification numbers were running well into three figures, and QSO's were being worked at such a fast rate, there was a distinct disadvantage in having to send "125" or a similar figure, compared with "54" or other two-digit numbers. We have therefore allotted two-letter groups, instead of numbers, this year. They will, of course, be prefixed by the Zone letter, so each club will have to send a six-figure group made up of three figures and three letters. Fair enough? (Yes, we know that some letters take longer to send than others, but then all call-signs aren't alike, either.)

We confidently expect at least at hundred clubs to take the air on November 16 and 17; how many logs will come in before the due date is problematical, but last year's figure of 89 should be beaten. So now go and get yourselves organised!

Activity Reports

Conversion from outdoor activities (mobileering, D/F, field days and so on) to the more sedentary winter programme generally comes as a shock. Clubrooms are being cleaned up, lectures and talks frantically arranged, and the secretary is going around with an even more worried look than usual

(which means "What on earth can we give them now?"). Happy are those clubs who can live on their own fat and produce lecturers from their own membership!

Annual General Meetings are much in evidence at this time of year, and the very first letter off the pile confirms this. **South Hants** will be holding theirs on October 12. And also the second, which is from **Hastings** . . . November 5 is the day, and we hope they don't suffer from too much opposition. (They now meet only on the first Tuesday of the month, at 33 Cambridge Road, Hastings). Their journal, *Natter-Net Notes*, is acknowledged.

Uxbridge, a relative newcomer to our columns, reports a very successful Trial Field Day on August 31; also that G3OKP is now giving a series of talks on Transmitter Design, which will continue for some weeks. (Next dates, October 14 and 28, 7.30 p.m. at St. Andrew's Church Scout Hut, Uxbridge Road).

Wessex will be visiting the Bournemouth telephone exchange, at Lansdowne Road, at 7.30 p.m. on October 14; on the 21st, a ragchew and Morse class at the president's QTH (47 New Road, Northbourne); and on November 4, a Junk Sale and Raffle, 8 p.m. at the Cricketers' Arms.

The radio society at **Keele University** will be taking part in the "Mart," at which the various societies canvass for members among the freshers. A station will operate on 160, 80 and 40 metres during the period of this Mart (starting October 12), signing G3COY/A, and the club will meet thereafter each Monday evening of the term. On October 14, the first such meeting, some films will be shown.

Lothians started their new session on September 12, with the president's address (via tape recorder, as he was absent on business!). They write: "The

"MCC"—MAGAZINE CLUB CONTEST

Rules and general information covering the Eighteenth Magazine Top Band Club Contest appear in this issue — see pp.442-443. This is a fast-running event, and many clubs will have their plans laid, with dummy-runs organised to test equipment and operators, well before November 16/17. This contest is always very good training for the less-experienced operators in competitive working.

programme for the season is complete — a miracle that happens every year by virtue of the very hard work put in by successive secretaries." On October 10, GM3DDE and 3DIQ will talk on Early Experiences on VHF; on the 24, GM3BQO will once more act as auctioneer for the Surplus Sale.

Melton Mowbray will be meeting on October 17 to hear the tape-recorded lecture, "Amateur Radio in the Antarctic," by Roth Jones — 7.30 p.m., St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

Hull — and see panel p.444 for QTH of new secretary — now meet on the second and last Tuesdays, at the Royal Oak Hotel, Portland Street, Ferensway. New members will be welcomed — especially beginners to the hobby.

This last remark might with profit be noted by many clubs, where fresh blood is badly needed. For example, **Enfield** (*Lea Valley Reflector*, August) state "We are losing the older members far too quickly, and others are losing interest . . . something is missing, we cannot rise to the heights, we cannot increase attendance at meetings." Yes, an injection of enthusiastic youngsters is what is needed in many quarters . . . but you have to go out and find them.

Crawley report that their Informal Meeting on the Hog's Back, near Guildford, during August, attracted an attendance of nearly 100, with some 25 mobiles on One-Sixty and Two! For their October meeting, at the Crawley Hq., G3JKF will be talking on Hints and Tips for the Home Constructor.

Barnet, who held their AGM on September 24, report an average attendance of 33 at meetings for the past year. They are already making arrangements for their Christmas Party (December 7, at Oakmere House, Potters Bar, where there is accommodation for 200). Tickets, at 5s. each, from G3MWWG.

Meetings are on the second and fourth Monday at **Edgware** (John Keble Hall, Church Close, Deans Lane), and on October 14 G2FUX will be talking on his tour of North America. October 26 is the date for their Top Band Contest, and on the 28th G3KRC will be giving some Hints and Kinks; films will also be shown.

The programme at **Blackpool & Fylde** continues with a talk, on October 7, by G3OPT, on Oscilloscopes (Design). On the 14th he goes on to the subject of building them. October 21 is noted as "Junk Sale — and clean-up afterwards" . . . other clubs might note! Then on October 28 and November 4, G8GG will give a talk and demonstration on a receiver for mobile or fixed stations. R.A.E. Classes have been arranged, at the Fleetwood Navigation School.

From the Newsletters

The **Cray Valley Newsletter** for September contains a short report, by G3MCA, on the Post Office Radio Tower, now rapidly "growing" in Bloomsbury. We also gather that members visited the ITA station at Norwood, where they did everything but climb the 500-ft. tower; and that a later visit was to the Orpington Telephone Exchange. [cont'd. p.444

MCC—EIGHTEENTH ANNUAL TOP BAND CLUB TRANSMITTING CONTEST RULES

- Duration:** Saturday, November 16 and Sunday, November 17; on both days between the hours of 1700 and 2100 GMT (eight operating hours in all).
- Frequency and Power:** All contacts to be made in the 1800-2000 kc band, using CW, with a power input not exceeding 10 watts to the final stage. All reasonable precautions will be taken to avoid interference with other services using the band.
- Call Signs:** Where a Club has its own transmitting licence and call-sign, that call-sign is to be used. Clubs without their own call may nominate a member's station as their official entry.
- Calling:** Clubs with call "CQ MCC," using the "three times three" technique. Infringement of this rule by the use of long CQ calls may entail disqualification.
- Scoring:** Other Club stations may be worked on each of the two days, and these contacts will count for points each time (see scoring instructions opposite). Non-Club stations may be worked once only, and will count for one point only. Inter-Club contacts will take the form of an exchange of six-character groups comprising RST, Zone letter (see map) and Club identification letters (see list and examples opposite).
- Non-Club Contacts:** Contacts with non-Club stations, counting for one point, will take the form of logging the RST and the other station's QTH. The Club's own QTH, not the identification letters, should be sent to complete the QSO.
- Logs:** Contest logs are to be neatly set out as follows: One side only of quarto or foolscap sheets should be ruled into eight columns, with name and call-sign of Club station on each sheet, headed thus: Col. 1, Date and Time. Col. 2, Call-sign of station worked. Col. 3, Outgoing six-character group. Col. 4, Incoming six-character group. Col. 5, RST out-going (to a Non-Club station). Col. 6, RST incoming (from a Non-Club station). Col. 7, QTH of Non-Club station. Col. 8, Points claimed for contact (see scoring instructions). Col. 8 is to be totalled at the foot of each page, and the running totals brought forward. The last page of the log should contain the following summary:
Total number of Club contacts; total number of non-Club contacts; total score. Comments on the equipment used, number of operators employed, general impressions and experiences are also invited, and should be added at the end of the log.
- Any Club station radiating a note consistently worse than T9 will be liable to disqualification.
- Logs, addressed to "Club Secretary," SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1, must be posted to reach us not later than Friday, November 29, 1963. The Editor's decision on the results will be final, and will be published in the January, 1964 issue of SHORT WAVE MAGAZINE.

THE MCC ZONES

- Zone F (Far North):** All Scottish counties.
- Zone N (Northern):** Northumberland, Durham, Cumberland, Westmorland, Lancashire, Yorkshire.
- Zone M (Midland):** Cheshire, Derby, Shropshire, Stafford, Hereford, Worcester, Warwick, Nottingham, Lincoln, Leicester, Rutland, Northampton, Bedford, Huntingdon, Cambridge, Norfolk, Suffolk.
- Zone S (Southern):** Somerset, Dorset, Gloucester, Wilts., Berks., Hants., Oxford, Bucks., Herts., Middlesex, Surrey, Sussex, Kent, Essex, London.
- Zone W (Western):** Cornwall, Devon, all GW, GD and GI. (GW includes Monmouth.)

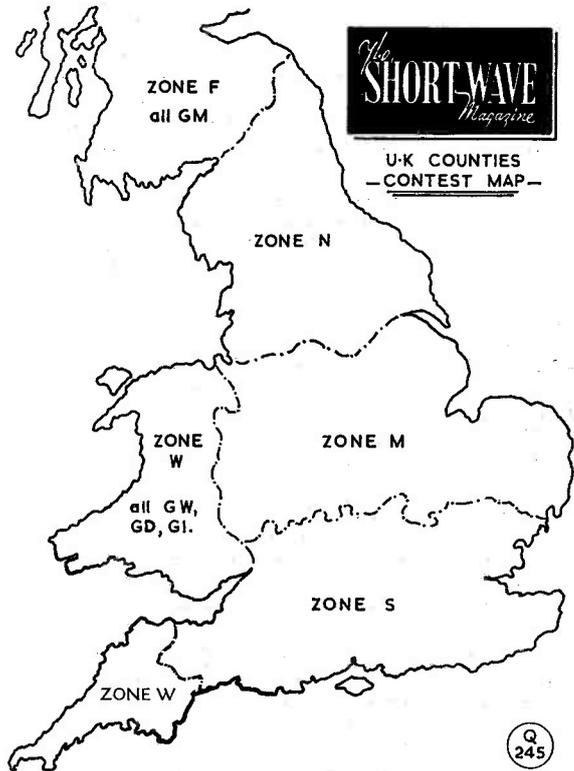
Scoring:

Contacts between Zones S and M,	4 points.
" " " S and W,	5 "
" " " S and N,	5 "
" " " S and F,	10 "
" " " M and W,	4 "
" " " M and N,	4 "
" " " M and F,	8 "
" " " N and F,	6 "
" " " N and W,	5 "
" " " W and F,	8 "

Contacts within one's own Zone count 3 points.
 Contacts with all non-Club stations count 1 point.

Examples:

Scarborough works Medway: Scarborough signs NSR, Medway signs SMD, both claim 5 points; Aberdeen works Port Talbot: Aberdeen signs FAB, Port Talbot signs WPO, both claim 8 points. In all QSO's, the Zone letter precedes the Club letters, following the RST group, e.g. "579 SCR" or "589 MCV."



Q 245

IDENTIFICATION LETTERS FOR CLUBS IN "MCC"

Aberdeen	AB	Crawley	CR	Midland Radio		Salisbury	SA
Acton, Brentford and Chiswick	AC	Dalriada	DA	Contest Club	MR	Scunthorpe	SC
Ainsdale	AI	Danbury	DB	Morecambe	MO	Scarborough	SR
Aldershot	AL	Deal	DL	Newark	NK	Sheffield	SD
Albright & Wilson	AW	Derby	DR	Newbury	NW	Shefford	SH
Aquila	AQ	Dollis Hill, GPO	DH	Norfolk	NR	South Birmingham	SO
Arborfield	AR	Dursley	DS	Norwich	NW	South London Mobile	SL
Ash Green	AG	Durham	DU	North Kent	NO	South Manchester	SM
ATC (Staffs.)	AT	East Kent	EK	North Notts	NN	South Shields	SS
Bangor University	BU	Eccles	EC	Nottingham	NT	STC, Harlow	ST
Barnet	BA	Edgware	ED	Overstone	OV	Stevenage	SV
Barnsley	BR	Exeter	EX	Oxford	OX	Stoke-on-Trent	SX
BBC Bush House	BH	GEC Research	GE	Paddington	PD	Stockport	SP
BBC Langham	BL	Grafton	GN	Painton (Northants)	PN	Stourbridge	SU
BBC Lime Grove	BB	Gravesend	GR	Petersfield	PT	Surrey (Croydon)	SY
Blackburn	BN	Greenford	GF	Plymouth	PL	Sutton & Cheam	SZ
Blackpool	BP	Grimsbey	GY	Port Talbot	PO	Thanet	TH
Blackwood, Mon.	BM	Guildford	GD	Preston	PR	Torbay	TY
Bradford Grammar School	BG	Halifax	HA	Purley	PY	Verulam, St. Albans	VR
Brentwood	BW	Hallamshire	HL	Radio Club of Scotland	RS	Wanstead & Woodford	WD
British Timken	BT	Harlow	HR	RAF Little Rissington	RL	Wakefield	WK
Burnham-on-Sea	BS	Harwell (AERE)	HX	RAFARS, Locking	RF	Wellingborough	WL
Burslem	BX	Harrow	HW	Ravensbourne	RV	Wirral	WR
Bury	BY	Hartlepoons	HT	Reigate	RG	Wolverhampton	WO
Cheltenham	CA	Kingston	KN	Rotherham	RO	Wolverton	WV
Chester	CE	K.W. Radio Club	KW	Rugby	RY	Yeovil	YV
Chiltern	CH	Leeds University	LS	St. Benedict's	SB	92nd Sig. Regt., Forfar	FR
City & Guilds	CG	Leicester	LC				
Civil Service	CS	Leven, Fife	LF				
Clifton	CL	Liverpool	LV				
Cornish	CO	Loughborough	LH				
Coventry	CV	Macclesfield	MA				
		Medway	MD				
		Mitcham	MH				

Note: This list includes all the Clubs recently taking part in "MCC." Other Clubs desiring to enter for this year's event should write in for identification letters, enclosing a stamped addressed envelope, before October 11, for publication next month. Letters should be addressed "MCC," Short Wave Magazine, 55 Victoria Street, London, S.W.1.)

Midland (*News Letter*, August) held their Annual Dinner on September 13, and their AGM on the 17th; the same issue gives details of a VHF Grid Dip Meter. The September *News Letter* reports their very successful participation in the Birmingham Show, the M.A.R.S. stand being the centre of enormous public interest—especially when they used CW, be it noted!

North Kent (*Newsletter*, September) are preparing their winter programme. September meetings covered Transistor Signal-Generators, and the subject of Vibration and its Measurement. October 10 is marked up for "Junior Forum," which sounds like an excellent idea.

The **RAIBC** (*Radial*, August) continue their good work for chair-borne and disabled amateurs and SWL's. *Radial* contains articles on the workings of a QSL Bureau, and on "One-Sixty and Worldwide DX" (the latter by G3PLQ).

Surrey (*SRCC Monthly News*, September) welcomed Frank Hyde, the well-known amateur expert in Radio Astronomy, to their meeting on September 10; next meeting, on October 8, will be a Junk Sale; they are preparing a new membership list for distribution.

Radio Club of Scotland (*GM Magazine*, August) continue to cover a wide and interesting variety of subjects, from Top-Band DX and Mobile to VHF—but no details of future meetings, unfortunately.

Wirral (*Newsletter*, August) announce their October 16 meeting, which will take the form of a Junior Section at 6.30 p.m. followed by a lecture on Valve Uses; their AGM was on October 2, and an

R.A.E. course is to begin shortly.

At their AGM, **Stratford-upon-Avon** (*News Sheet*, Summer '63) elected their officers for the next twelve months and decided upon the activities for the coming year, which opened, for them, on September 6. They have a scheme whereby the junior members will build simple receivers to enable them to listen to the Sunday morning net — other clubs might well copy this excellent idea.

Southgate (*Newsletter*, September) now sport the call G3FSG. At their September meeting G3DZW talked on SSB; the October meeting will hear a talk by a representative of Acos Ltd. The AGM is in December.

Mitcham, from whose newsletter we quoted a month or two back concerning apathy and poor attendances, is now proposing the extreme step of closing down altogether. From their September newsletter we gather that the average attendance has dropped as low as seven members. To settle all this, a special meeting has been called for October 11, at The Canons, Madeira Road, Mitcham—and we hope they will find a way out, short of liquidation.

Purley paid a visit to **Reigate** on September 21, to hear G3FZL on "Matters Mainly VHF." Their own meetings are on the first and third Fridays, 8 p.m. at the Railwaymen's Hall, Whytecliffe Road; this we glean from their *Splatter* (September). From **Reigate**, through their *Feedback* (August) we gather that their speaker on October 19 will be John Rouse, G2AHL; other clubs will be invited to this meeting. Miss Nell Corry, G2YL, will give an illustrated talk

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
 BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.
 BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
 BRISTOL: E. J. Davis, 72 North View, Westbury Park, Bristol, 6.
 CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley, Surrey.
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
 CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
 EDGWARE: D. L. Lisney, G3MNO, 17 Pickett Croft, Stanmore, Middx.
 ENFIELD: R. Langston, 54 Poynter Road, Bush Hill Park, Enfield.
 EXETER: A. T. James, G3RUV, 18 Lonsdale Road, Heavitree, Exeter.
 GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
 HALIFAX: J. Ingham, G3RMQ, Lambert House, Greetland, Halifax.
 HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
 HOUNSLOW: R. T. Heywood, G3NHH, 383 Whitton Drive, Isleworth.
 HULL: W. H. Hall, G3RMX, 38 Balmoral Avenue, Hull.
 KEELE UNIVERSITY: V. J. Reynolds, G3COY, Department of Communications, University of Keele, Staffs.
 LOTHIAN: L. R. Richardson, GM3AKM, 64 Easter Drylaw Place, Edinburgh 4.
 MANCHESTER: A. B. Langfield, G3IOA, 2 Rowland Street, Moston, Manchester 10.
 MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield.
 MEDWAY: P. J. Pickering, G3ORP, 101 Chatham Road, Maidstone.

MELTON MOWBRAY: D. W. Lillie, G3DFD, 23 Melton Road, Ashfordby Hill, Melton Mowbray.
 MIDLAND: C. J. Haycock, G3JDI, 360 Portland Road, Birmingham 17.
 MITCHAM: A. Thurley, 50 Bruce Road, Mitcham.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.
 NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.
 PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverell, Plymouth.
 PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
 R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 10 Sturton Road, Saxilby Road, Lincoln.
 READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 ROYAL SIGNALS: Hq. Secretary, Royal Signals A.R.S., Signals 2(a), The War Office, Whitehall, London, S.W.1.
 SCARBOROUGH: P. Briffcombe, G8KU, Roseacre, Irton, Scarborough.
 SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.
 SOUTHGATE: K. Spicer, G3RPB, 22 Clifton Road, London, N.3.
 SOUTH HANTS: P. A. L. Shoosmith, G3MDH, 7 Fairfield Close, Hythe, Southampton.
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Nr. Leeds.
 SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
 SUTTON COLDFIELD: K. H. Varney, G3DMV, 149 Whitehouse Common Road, Sutton Coldfield.
 UXBRIDGE: A. Duell, Treetops, Bakers Wood, Denham, Bucks.
 WESSEX: G. J. Fowle, 138 Surrey Road, Branksome, Poole.
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.
 W.A.M.R.A.C.: Rev. A. W. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray, Leics.
 WORCESTER: T. W. Byrne, YMCA, Henwick Road, Worcester.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

on November 23.

General Activities

Plymouth closed their clubroom during August, but held informal meetings at members' homes, and also paid a visit to the local BBC station. They will shortly be active as G3PRC. Meetings are at the clubroom (Virginia House Settlement, Palace Street) except for the first in the month, which is held at New Marlborough House, Buckwell Street (both at St. Andrews Cross, Plymouth). On October 15 there will be a Film Show, and on November 9 a Quiz, with the Torbay Club as competitors. February 8 has been fixed for the Annual Dinner.

Reading have a Junk Sale on October 26 (the date previously fixed for a talk on the 435 mc and 1296 mc bands); on November 30 there will be a demonstration of T.W. Equipment, by G3HGE. The club net is on Mondays, 8.30 p.m. on 1981 kc.

Northern Heights will be taking part in the Jamboree-on-the-Air on October 19 and 20, and will hold a display of members' gear on the 23rd. **Scarborough** report numerous visits from holiday-making amateurs, and two from overseas — VU2GG and DJ2JJ. October 17 is Constructors' night, and October 24 is booked for a talk on Mobile work by G3PEJ.

Hounslow, now settling down in the new premises, reports R.A.E. classes in full swing, and they hope soon to be active on Top Band; they are still looking for more support from local licensed amateurs.

Acton, Brentford & Chiswick will be hearing a tape lecture by G3OJS on Basic Transistor Principles at their next meeting—October 15 at the AEU Club, 66 High Road, Chiswick.

Mansfield continue to meet every Friday at the Hope and Anchor Inn, Union Street; their new secretary is G8HX (*see* panel) and chairman G2MX. Morse and technical instruction are under way, and it is hoped to operate with a special call from the local Hobbies Exhibition.

Civil Service, meeting, as always, in the Science Museum, have a lecture on October 7 from Mr. J. C. Pellatt (C.E.G.B.) on Electricity Generating Stations. On the 21st there is an informal meeting, and on November 4 a talk on Short Wave listening, by G3AAE.

Sutton Coldfield recently visited **South Birmingham** for a special prize-giving evening, in connection with the inter-club competition held earlier in the year. October 10 is the date for a talk on Silicon Rectifiers, by G3AYJ; and October 24, Club natter night, will include G3CNV's talk on "How to Stay Alive," with illustrations by the St. John Ambulance Brigade and the Fire Brigade. Members will be advised of the location for this meeting; the other is at Hq., as usual.

Exeter met on October 1 for a talk on Aerial Tuning Units; next meeting will be on November 5, 8 p.m. at the George and Dragon, Blackboy Road.

Yeovil reports that activity is at a high level. They have Sunday-morning nets on both 1.8 and 28 mc; CW instruction is given by G3BEC on Wednes-

days at 7.30 p.m., and a turn-out of at least 25 members is normal for the weekly meetings. The club recently visited the BBC station at Rampisham, and hope to go to a Forward Scatter station in November.

Subject for the September meeting of **Cornish** was "Aerials for Restricted Spaces," by G3NVJ. A Mullard film strip on the CRT was explained by G3OJY. At the October meeting a demonstration of the "Kiss of Life" method of resuscitation will be given (S.W.E.B. Recreation Hall, Pool, Camborne).

Medway travelled *en masse* to Southend for their annual event in August. They have had to move their Hq. once again, and are now installed at the Brasenose Club, Nelson Road, Gillingham, where they are allowed to erect outside aerials. Meetings are on alternate Mondays, 7.45 p.m., as follows: October 7, Constructional competition, talk on Kit Transmitters; October 21, members' discussion on PSU design; November 4, Junk Sale and CW Proficiency Tests.

Grafton meet every Friday (Montem School, Hornsey Road, London, N.7) and on October 4 (publication day) will have G6CJ putting on his famous "Aerial Circus." On the 18th G3DZW will talk about SSB, and October 25 will be the monthly "SWL Corner." There are still vacancies for the R.A.E. and Morse classes on Mondays and Wednesdays.

Manchester have an Open Night on October 16, a Junk Sale on the 23rd and a talk by G3IOA on the 30th. A new venture for them is a "Pedestrian D/F Contest," on Sunday, October 13. The hidden Tx will be within three miles of the starting point, and roller-skates will not be allowed...! Meetings every Wednesday at the Community Centre, 203 Droylsden Road, Newton Heath, Manchester 10.

Worcester now meet at their headquarters (YMCA, Henwick Road) on four nights each week. Morse on Mondays, R.A.E. (G3NUE) on Tuesdays, Morse again on Wednesdays and general discussion and operation of the club Tx (G3GJL) on Saturdays. Three very successful days were spent operating GB3WOR from the local Hobbies Exhibition.

From **Halifax** we hear that their next meeting is on November 12, with R.A.E. instruction and a talk on QSL'ing by G3NIZ. The **Crystal Palace Newsletter** No. 94 reports the Club's participation in the September VHF field day, when stations were operated on 4m., 2m. and 70 cm.—and not many local groups are in a position to do that. But Crystal Palace have a membership very interested in and active on VHF, largely inspired by their hon. secretary, G3FZL.

It is reported that the **Bristol Amateur Radio Club** got off to a very good start on September 9, there being no less than 53 potential members at the inaugural meeting. It has been decided to meet each Monday and Thursday, 6.30-10.0 p.m., at 43 Ducie Road, Bristol, 5, under the chairmanship of G4UZ. Morse practice sessions have already begun, and we are asked to say that all interested in Amateur Radio in the Bristol neighbourhood are invited to get in touch with the hon. secretary.

Spen Valley send in a fortnightly meeting programme arranged right into June, 1964—the sign, if ever there was one, of a well-organised group with an active and experienced secretary. In fact, Norman Pride has done the job for many years now, and Spen Valley take care that he is re-elected at each AGM! Lecture headings for the next two months include The Use of Transistors, SSB, Electronic Marshalling Yard Control (by a representative of British Railways), and Electronics in the Office, these being interspersed by various visits of technical interest.

The big day for W.A.M.R.A.C. (World Association of Methodist Radio Amateurs and Clubs) is on October 5, when their "Wamfest" is to be held—and this will be at John Wesley's original Chapel in City Road, London, E.C.1.

An extensive compendium of news, reports and

general information about the Royal Signals Amateur Radio Society—which would provide us with notes for this feature for some months—has been received from the Hq. secretary. It shows that R.S.A.R.S. is now a very well-organised body, with full War Office support. The Society's surplus on operations for the year to July '63 amounted to £124, and the accumulated fund stands at nearly £350. The membership list gives the QTH's of more than 200 members—of all ranks, retired and serving—the great majority of whom hold callsigns. Membership of R.S.A.R.S., which is open to all past and present Corps personnel interested in Amateur Radio, includes a regular copy of *Mercury*, the Society's journal; this, in addition to much personalia, includes useful technical material. If you qualify for membership, look up the Hq. secretary's address in the panel on p.444.

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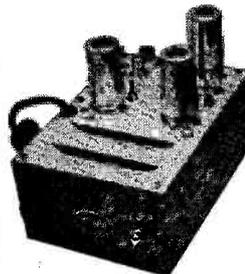
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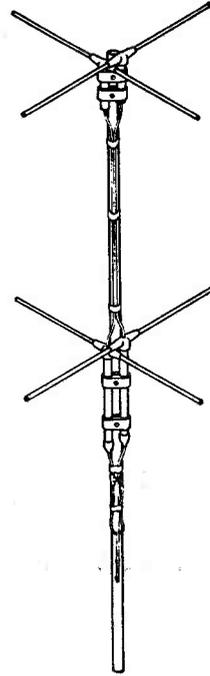
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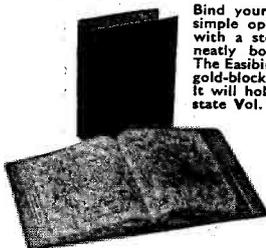
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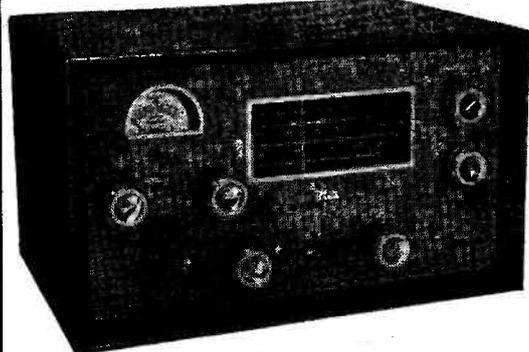
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SMALL ADVERTISEMENTS, READERS—continued

QRT SALE: 80-10m. Exciter. Gelo VFO, 807 PA, mod. deck 2/805, UM4 driver trans., 1000v. PSU. Offers?—Box No. 2881, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

DX-40 with VF1U, mint condition, £27 10s. R.107 with converters for 10 and 15 metres, £10. B2 complete, £12 10s. Homelab signal generator, £2 10s. Wheatstone Morse Recorder, £1 10s.—G3LMD, 77 Ridgeway Drive, Lydiat, Lancashire.

HRO MANUAL. Information, theoretical circuit and pictorial diagram, adjustment points all stages, with complete realignment procedure, components lists, values, etc. Installation, operation, special features, notes, etc., 15s. 6d. Send s.a.e. for indexed details.—G3ANK, 145A Station Road, Sidcup, Kent.

R. 1392 RECEIVER 95-150 mc, in excellent condition, £2 10s. Companion power supply, metered, fused, etc., £2 10s. The two for £4. Also Gelo 4/102, complete dial escutcheon, etc., £2.—Hayes, 31 Beverley Crescent, Northampton. (Tel. 33944.)

888A Rx For Sale, mint condition, £70. Deliver Midlands. Lenco L70 pick-up with Deram, £8 10s.—Franklin, 2 Berkeley Drive, Kingswinford, Staffs.

SSB RECEIVER, 13 valves, 4 half-lattice xtal filter, AVC, S-meter, Eddystone dial. Ganged plug-in coils for 14 mc; blanks for other bands, £30, buyer collects. Jennings vacuum antenna relay 24 volt, £3. New valves: Eimac 4/250A (2), £6; 6146 (2), 17s. 6d.; 304TL, £2; 5763 (2), 5s.—Marshall, G2MA, 57 Godstone Road, Rotherham, Yorks.

LABGEAR TOPBANDER Transmitter, as new, £17. Hallicrafters S-40A Communications Receiver, bandspread, 0.55-45 megacycles, perfect, £19. Radio Compass BC-433C, unmodified, £3 15s. Bendix MN26Y radio, unmodified but with flexible drive and control panel, 3.4-7.0 megacycles, £2 10s.—G3PWW, 4/11 Wyndham Crescent, N.19. (Archway 4208.)

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WANTED: Heathkit DX-40U with VF1U in excellent condition, or K.W. "Vanguard."—T. A. Mellor, 34 Southdown Road, Shoreham-by-Sea, Sussex. (Tel. Shoreham 4107.)

SMALL ADVERTISEMENTS. READERS—continued

BC-348M Receiver, £12 10s. Top Band Transmitter phone/CW, TT11 Final, plate-screen Mod., £13. Pye Car Radio PC59CR, 12v., £10. Prefer buyer collect.—Tunnah, 16 Louvaine Avenue, Bolton. (Phone 42660.)

SALE: Hallicrafters S.40B, 550 kc to 44 mc band-spread, NL, excellent working order and appearance, complete with manual, spare valves. Sell £20, o.n.o.? Or exchange Rx, W.H.Y.?—Wickstead, 99 Earlsfield Road, London, S.W.18.

IMMACULATE LABGEAR LG.50 Tx, ready for operation, £28 (owner non-QR).—V. W. Stewart, 9 Belmont Avenue, Juniper Green, Midlothian.

CHEAP VALVES! 6X4, 6AK5W, 6AQ5, 6AU6, 12AT7, 12AU7, 12AX7, 2s. 6d. 6AL5W, 5687, 2s.; 5Q type, 1s. extra. Ceramic bases and cans, 1s. extra; add 9d. per valve post.—G30MJ, 20 Highbury Crescent, Bessacarr, Doncaster.

EDDYSTONE 750 double superhet, 32 mc to 480 kc, 11-valves, maintained by Eddystone, first-class performance and condition, £40; prefer buyer collects, Thursday or Sunday.—Thorpe, 41 Costock Avenue, Hucknall Road, Nottingham.

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SALE: Geloso 209R 14-valve double-conversion, S80-10m. amateur bands only, selectable sidebands, as new, £50.—GM3PZR, 5 Rosselm Cottages, Rossie, Auchtermuchty, Fife.

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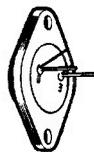
SALE: HRO, fully modified, all miniature valves, built-in PSU, xtal cal., noise limiter, all coils, some band-spread, variable BFO injection, £14. Also have transistorised PSU 12v.-265v. at 65 mA, £2; has worked /M.—G3OWQ, 12 Robin Hill, Bedford.

FOR SALE: Collins S-Line equipment: 32S1 Tx, 75S1 Rx, 516F2 115v. AC supply, and 312B-1 matching speaker, complete in original cartons, £350.—G3KME, 13 Carlton Avenue, Wilmslow, Cheshire.

MAGAZINES WANTED: Early runs of T. & R./R.S.G.B. *Bulletin* up to 1955; any issues of *The Marconigram* 1911, 1912, 1913; any issues *QST* 1916-1921; *Modern Electrics* 1908-1914; *CQ* dated April 1945; also *Radio Servicing*, Vol. 5, published 1960 by Norman Price (Publishers), Ltd. Full details and price wanted to—Geoff Watts, 62 Belmore Road, Thorpe, Norwich, Norfolk. (NOR 72.T.)

ELECTRONIC Keyer and paddle, built-in PSU, audio monitor, dot-dash-space ratio, speeds 4 to 45 w.p.m., £12. GDO, built-in PSU, coils 500 kc to 32 mc, needs calibrating, £6. No. 10 Crystal Calibrator, 30s. Two 6CW4's and bases, 12s. 6d. each; one 6DS4 and base, 12s. 6d. Two-section 20 ft. steel mast, rotatable, collect, £2. Add postage other items.—G3OKX, 34 Preston Avenue, Alfreton, Derbys.

WANTED: RTTY Terminal Unit, preferably of commercial manufacture; also Auto-Transmitter. Details and price to—G3NPF, 2 Edith Road, Southend-on-Sea, Essex.



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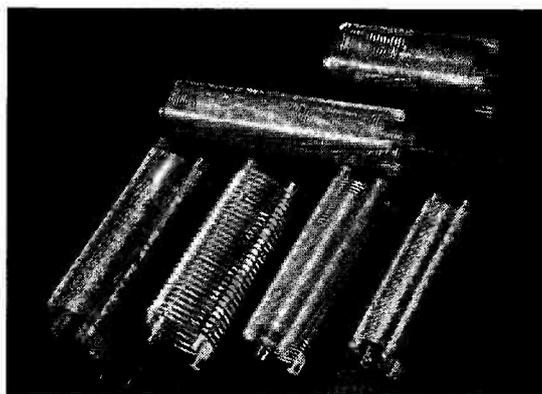
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Oscilloscopes: Furzehill Type 1684 D/2, £25; Hartley 13A double beam, £25; Mullard E.800, £20; Dumont Type 208, £25; Coastal Radio ECM 15, £12. AEL double-beam, by M.S.S. Recording Co., £17 10s. Bridge Inductance, 0 to 50 Henry, AC, £4 10s.

Phone Bridport 3307 for further information or near offer. All items can be viewed working. Please arrange collect if possible, or add carriage.—Lucas, Durbeysfield Guest House, West Bay, Bridport, Dorset.

FOR SALE: 150w. transmitter, Panda Explorer, E 10, 15, 20, 40, 80 metres; CW/NBFM/AM; separate Woden modulation transformer, most valves, new, some attention required to modulator. All working, bargain, £28; buyer collects. —G3RIA (Phone: BALham 7516), 898 Garratt Lane, London, S.W.17.

FB MOBILE Tx, 160-80-40 metres, very compact, 12v., complete with modulator. Minimitter, £7 10s., or exchange receiver.—Box No. 2884, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: AVO roller panel Valve Tester, complete with manual, circuits, instruction book; overhauled, checked; £10, carriage extra.—G3OIB, Read Grammar School, Drax, Nr. Selby, Yorks.

EDDYSTONE S.640, immaculate, perfect order, manual, plus cash—for HRO-5T. Field telephones Type F, Type H, 50s.; both plus postage.—Phillips, Firdowne, Gomeldon, Salisbury.

SALE: Complete aerial system: 3-band Quad, 45 ft. steel tower, prop-pitch motor, transformers, indicator system, standing-wave indicator, 'scope monitor, all cables, £60 o.n.o.?—55 Bank End Lane, Almondbury, Huddersfield.

QV06-40, QV07-40 (829B), 6146, all brand new, 35s. each; 12AT7W (highest quality), 4s. each. 500 μ A meter, 3-in., 27s. 6d. All plus postage.—Box No. 2885, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

EQUIPMENT ex-GM4QV: Green and Davis 2-metre converter, £8; Geloso table mike, £3; Decca Radar Type 12, complete; B29; 19 Sets; Q-Max 4/10 Tx; Wilcox-Gay VFO; R208; T.1141 2-metre Tx; Cossor 'scope. Buyer collects.—Ramsay, 10 Falkirk Road, Bonnybridge, Stirlingshire, Scotland.

SALE: HRO Senior; six GC, one 20m. BS coils, power pack, speaker, £15. Buyer collects.—Broome, 62 Evesham Road, Stratford-upon-Avon, Warwicks. (Phone 4378.)

SALE: G2YH Crystal controlled 2m. converter, £4 10s. G5JU 2m. Tx, QQV06-40 PA, £3. 4-over-4 skeleton slot ant., 35s. Modulator, mobile; pp/parallel, 12AX7's, 35s. Details s.a.e.—Bowen, 31 The Crescent, Donnington, Wellington, Salop.

EXCHANGE: New Mecablitz 110 electronic flash with charger, for comm. Rx. Straight swap.—G3GDJ, 43 Dorset Street, Derby.

JOHNSON "INVADER" latest SSB Transmitter, mint, selectable sidebands, 10-80 metres, full 200 wats p.e.p., nearest £150; terms considered.—G2CDN, 13 Wood Lane, Isleworth, Middlesex.

WANTED: recent R.A.E. Correspondence Course.—Duncan McGregor, 17 Broomhill Crescent, Bellshill, Lanarks.

FOR SALE: BC-55 50s. Brand new AR88D, manual, tools, offers? Details s.a.e.—Thompson, Mere Close, Hull Road, Hornsea, Yorkshire.

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WANTED: AP66862 (FSR.1.1X) RTTY converter; also Type 26B 80-0-80v. PSU.—Bullock, 15 Salisbury Close, Princes Risborough, Bucks. (Tel. 789.)

SX-28, good condition with matching speaker. Surrey Area. Buyer collects, £25.—Box No. 2887, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Cowl-Gill motor. Must be working, any condition considered. Also Sept. and Oct., 1953, *Short Wave Magazine*.—R. Everitt, Ferndale, Ardleigh, Colchester, Essex.

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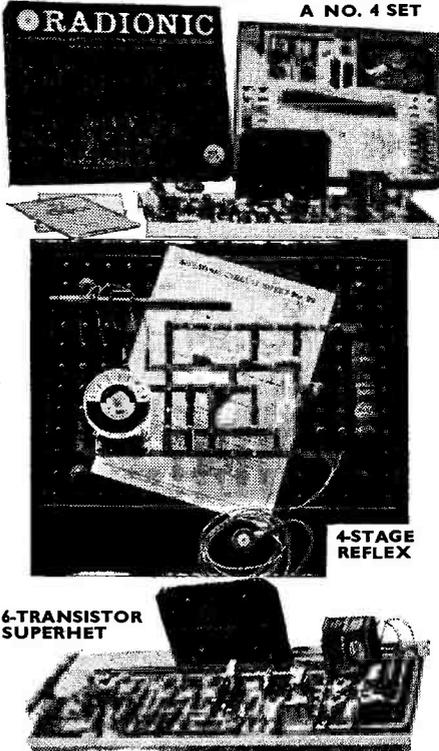
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